PROCEEDINGS OF THE UNITED STATES NATIONAL MUSEUM

issued by the

SMITHSONIAN INSTITUTION
U. S. NATIONAL MUSEUM

Vol. 95 Washington: 1944 No. 3180

STUDIES IN NEOTROPICAL MALLOPHAGA (III)

[TINAMIDAE No. 2]

By M. A. CARRIKER, Jr.

SINCE the publication in 1936 of my first report on the Mallophaga of the tinamous, I have acquired much additional material of this interesting group, not only of the same species treated in that report but also of many additional ones, some from the same hosts and others from hosts on which no Mallaphaga had previously been recorded. Several other workers on Mallophaga have, in the meantime, described additional species and reexamined old types, with the result that much further light has been shed on little-known genera and species, making it necessary now to revise many of the conclusions reached in my first report.

For the present paper I have very carefully worked over all my old material in connection with the new, taking into consideration the critical notes published by other authors, many of which I heartily endorse while with others I am forced to disagree. These matters will be fully considered under the pertinent genera and species.

The large quantity of material I have assembled and studied has enabled me to arrive at some tentative conclusions that I am convinced further work will corroborate. Miss Clay (1937) has suggested that some of the genera erected by me in 1936 may prove to be unnecessary and that additional species may be found which will form connecting links between certain genera. However, I am not prepared to take this view. On the contrary, the more I study this fascinating family of Mallophaga the more I am convinced that we are dealing with a large number of genera composed of species and subspecies very closely

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related. Many of these genera are monotypic, that is, they consist of but a single species, which, in turn, is split up into many subspecies, which differ very slightly among themselves.

It seems plausible that many genera that at one time may have contained numerous species have now been reduced to but a few or a single species, more persistent than the others and less plastic. Undoubtedly the avian family Tinamidae is very old and probably was much larger in some prehistoric age than it is today, only certain types having persisted, so that in this way many intermediate species and even genera have disappeared.

Another fact that stands out very forcibly is that some genera of Mallophaga are restricted to certain genera of hosts. Most conspicuous in this respect is the group infesting the tinamous whose habitat is the grasslands of southern South America and the high altitudes of the Andes. These are the genera *Tinamotis*, *Nothoprocta*, *Nothura*, and *Rhynchotus*. It is only natural that in the tinamous, which harbor such a large number of highly diversified and specialized genera of Mallophaga, the two distinct divisions of the host family should have strikingly different types of mallophagan parasites, and a glance at the host list bears out this fact. Only two genera of Mallophaga, *Strongylocotes* and *Heptapsogaster*, have so far been recorded from both groups of the tinamous, but I am not at all convinced that any of the species concerned are properly allocated generically. *Strongylocotes lipogonus* is a very aberrant type and might well be separated from the rest of the genus, while *Heptapsogaster dilatatus* (Piaget) is undoubtedly a *Rhyncothura*, although previously placed by me in *Heptapsogaster*. As for *Heptapsogaster tesselatus*, from *Nothoprocta*, I was doubtful about its allocation in 1936, and said so at the time, and am more so at present, but I am not yet prepared to place it in *Rhyncothura*.

Miss Clay (1937, p. 140) has described *Heptapsogaster testudo* from *Nothura maculosa peruviana*, but its allocation in *Heptapsogaster* is clearly an error, since it is a typical *Rhyncothura*, a genus confined to *Rhynchotus*, *Nothoprocta*, *Nothura*, and *Tinamotis*, while *Heptapsogaster* is found almost exclusively on *Crypturellus*, a woodland-inhabiting genus of tinamous.

The following genera of Mallophaga have thus far been taken only on the savanna-, or *puna*-, inhabiting forms of tinamous: *Tinamicola*, *Rhyncothura*, *Docophorocotes*, *Cuclotocephalus*, *Lamprocorpus*, and *Tinamotaecola*. The only species of Amblycera certainly known to infest the tinamous have been taken on two genera of this group of hosts—*Menacanthus arctifasciatus* (Piaget) on *Rhynchotus* and *M. nothoproctae*, new species, on *Nothoprocta*.

All the remaining genera, except one, now known to be parasitic on the grassland-inhabiting tinamous belong to the family Heptapsogastridae, those belonging to the Philopteridae being restricted to the woodland group of tinamous (*Pseudolipeurus*, an offshoot of the old genus *Lipeurus*, and *Pseudophilopterus*, most likely derived from *Philopterus* or its progenitor). However, a new genus is described in this paper (*Tinamotaecola*) from *Tinamotis* which is a philopteroid and seems to bear the same relation to *Degeeriella* that *Pseudophilopterus* bears to *Philopterus*.

Our knowledge of the Mallophaga from the grassland tinamous is much less extensive than of the woodland-inhabiting forms, but the evidence now in hand seems quite conclusive that all, or nearly all, the genera of lice infesting them are peculiar to that group of hosts. I have yet to find any trace of the "scent" gland on any species of Mallophaga infesting the grassland tinamous, while many of the species now placed under *Heptapsogaster* and allied genera possess them. I should not yet say that the presence or absence of scent glands should be taken as a generic character, but certainly these organs deserve closer attention.

I agree with Miss Clay (1937, p. 135) in her suggestion that perhaps some of the species now placed by me under *Heptapsogaster* (such as *platycephalus* and *petersi*) should be removed from that genus, but I do not agree with her suggestion of placing them under *Megapeostus*. I think that any revision of this kind should await additional material and further study.

In a friendly spirit I might make more or less the same criticism of Miss Clay's arrangement of the species and genera in her splendid report on the Mallophaga of the gallinaceous birds. Her genus *Oxylipeurus* is, to my way of thinking, entirely too unwieldly and seems to contain species not congeneric. This genus contains species from both Old and New World gallinaceous birds and from such distantly related avian families as Phasianidae, Cracidae, and Perdicidae. There are many superficial resemblances between some of the parasites from these three families, but there are more *actual* differences between some of them than there are between some of the *genera* of their hosts.

I fully realize the inadequacy of my 1936 report on the lice of the tinamous and know that certain changes in my original classification are inevitable, but I do not think that these changes should be made without ample material to justify them. Quite a number of corrections and changes have already been made by myself and also by other workers, some of which I heartily endorse; others I cannot accept, because my own perhaps more ample material does not corroborate them. My hope is that in the present report I may have added con-

siderably to our knowledge of this difficult but fascinating group of insects and laid a secure foundation for future work.

A most regrettable error was made in my 1936 report regarding the measurements given there. *All* measurements given are *too small*, owing to an error made in calibrating the eye-piece micrometer with the stage micrometer, which consisted of 1.1 mm. instead of 1 mm. as I had supposed. All these published measurements may be corrected by multiplying each by the constant 1.084. In the present report, as well as the first, all measurements were made by means of the eye-piece micrometer. All measurements used are in millimeters, and all drawings were made by me.

I take this opportunity of expressing my thanks to Dr. Alexander Wetmore, director of the U. S. National Museum, for his permission to study all the Mallophaga collected while engaged in ornithological explorations for that institution in Mexico and Colombia, and for his assistance and encouragement during the preparation of this report, as well as that given me by Dr. E. A. Chapin, curator of insects in the same institution. I also extend my appreciation to Dr. G. H. E. Hopkins for his generous cooperation and helpful criticisms from time to time, especially in having fresh material compared with the old types of Piaget and others, thereby establishing certain identifications beyond question.

Suborder AMBLYCERA Kellogg

Family MENOPONIDAE Mjöberg

Genus MENACANTHUS Neumann

MENACANTHUS NOTHOPROCTAE, new species

FIGURE 1, *a–c*

Types.—Male and female, adults, from *Nothoprocta cinerascens*, collected by the author at Villa Montes, El Chaco, Bolivia, November 6, 1936; in collection of author.

Diagnosis.—Closely related to *M. arctifasciatus* (Piaget), taken on *Rhynchotus r. rufescens* and *R. rufescens maculicollis*, the female differing chiefly from that species in the size and proportions of the body segments, shape of head, different shape of last abdominal segment, and its chaetotaxy, as well as the chaetotaxy in general of the abdomen, the present species having the hairs, both dorsal and ventral, shorter and fewer.

The male of *M. arctifasciatus* not having been taken by either Piaget or myself, no comparison can be made of the genitalia, which will no doubt prove to be distinct.

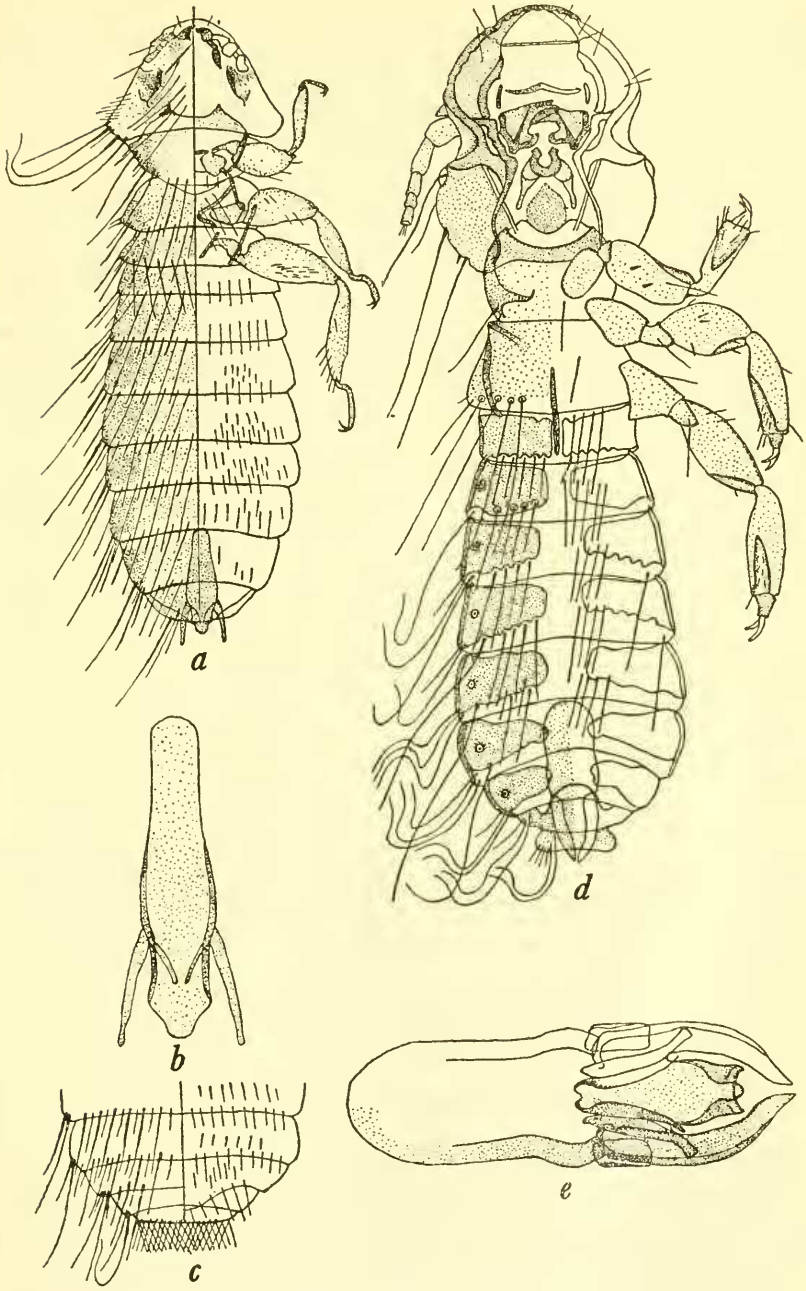

FIGURE 1.—MENACANTHUS AND TINAMOTAECOLA

a–c, *Menacanthus nothoproctae*, new species: *a*, Male; *b*, male genitalia; *c*, tip of female abdomen.

d, *e*, *Tinamotaecola andinae*, new genus and species: *d*, Male; *e*, male genitalia.

In the female of both *arctifasciatus* and *nothoproctae* there is a decided horizontal slit on the side of the head slightly behind the tip of the antennae. This slit is more pronounced in *arctifasciatus*, while in the male of *nothoproctae* it is completely closed, there being but a trace of it visible. The male genitalia are simple, consisting of a basal plate, semimovable paramers, and rigid endomeres, the paramers being attached on the *side* of the basal plate, while the latter extends nearly to the tips of the former.

The discovery of another species of *Menacanthus* on another genus of Tinamidae creates a puzzling situation. They are the only species of Amblycera known to be parasitic on this family of birds, so that they are undoubtedly of much more recent acquisition than the multitude of complex genera and species of Ischnocera found so abundantly on them.

MEASUREMENTS OF MENACANTHUS

Structure	*M. nothoproctae*				*M. arctifasciatus*	
	Male		Female		Female	
	Length	Width	Length	Width	Length	Width
Body	1.76		1.82		2.01	
Head	0.33	0.50	0.37	0.53	0.35	0.55
Prothorax	0.21	0.37	0.26	0.42	0.23	0.40
Mesothorax	0.17	0.44	0.23	0.51	0.17	0.50
Metathorax	0.09	0.47	0.11	0.58	0.13	0.56
Abdomen	1.06	0.58	1.11	0.82	1.33	0.83
Genitalia	0.32	0.08				

In *nothoproctae* the paratergal plates are more heavily pigmented than the tergites, while in *arctifasciatus* the two are more or less of the same pigmentation but are separated by a narrow hyaline space.

Suborder ISCHNOCERA Kellogg

Family PHILOPTERIDAE Burmeister

TINAMOTAECOLA, new genus

Genotype.—Tinamotaecola andinae, new species.

Head circumfasciate, with pronounced antennal fossae and concave occiput; small fixed trabeculae; antennae simple, similar in the sexes, with second segment the longest and the last three subequal.

Transverse clypeal suture present, but fused at the sides; clear postantennal suture running diagonally backward from base of antennal bands to sides of occiput; narrow clypeal band completely

encircling the *frons;* internal clypeal bands running from base of antennal bands to front of head; occipital bands continuous from base of antennal bands to sides of occiput.

Thorax small, the combined segments much smaller than the head. Prothorax quadrilateral; pterothorax with mesothorax indicated, but the two segments completely fused; sides slightly divergent and posterior margin flatly convex, with numerous, very long, pustulated hairs set submarginally.

Abdomen elongated, widest at segments V and VI, similarly shaped in the two sexes, and composed of *nine segments*, with segment IX very small; tergal plates widely separated medially; paratergal plates very narrow and fused to tergites; sternal plates apparently absent.

Male genitalia well developed, basal plate longer than paramers; paramers heavy; dorsal endomeral plate large, with small penis attached; slender ventral endomeral plates on each side of base of dorsal sclerite. Legs stout but not excessively long, with tibiae and femora about equal; trochanters well developed; the second and third pairs of coxae unusually large, articulated near sides of thorax, and with more than half of segment *outside* of body.

The genus superficially resembles some of the circumfasciate forms of *Degeeriella*, but the head structure seems to be unique, while the genital armature is of an entirely different type, as well as the structure of the abdominal sclerites. It probably bears a relationship to the *Degeeriella* group similar to that which *Pseudophilopterus* bears to *Philopterus* and *Pseudolipeurus* to *Esthiopterum.*

This is the third known genus of Philopteridae whose true host is unquestionably a species of Tinamidae. It has been clearly proved that the true host of *Lipeurus rhynchoti* Carriker is a species of Cracidae and that *Cuclotogaster laticorpus* Carriker is the ordinary chicken louse, *Cuclotogaster heterographus* (Giebel).[1] I doubt very much whether the true host of *Esthiopterum tataupa* Carriker is *Crypturellus tataupa*, and so the only Philopteridae left whose true hosts are unquestionably species of the Tinamidae are *Pseudolipeurus*, *Pseudophilopterus*, and *Tinamotaecola.*

TINAMOTAECOLA ANDINAE, new species

FIGURE 1, *d*, *e*

Types—Male and female, adults, from *Tinamotis pentlandi*, collected by the author at Chocaya, Bolivia, June 18, 1936; in collection of the author.

Description of male.—Front of head circular, with a slight protu-

[1] Carriker, M. A., Jr., Lloydia, vol. 3, No. 4, p. 298, Dec. 1940.

berance on the median portion, where the clypeal band is slightly submarginal (not shown in figure) and has the inner margin crenulated. The arrangement of the clypeal, antennal, and occipital bands is somewhat complicated and can best be understood by consulting the figure. The mandibles are large but not thickened and are set but slightly forward of the middle of the head; the left mandible is toothed and the right sharply pointed; pharyngeal sclerite and gland large; gular plate small and but slightly chitinized; eye prominent and set with an extremely long, strong hair (very unusual). Temples flatly rounded, with two large, pustulated hairs and one small; occipital margin deeply reentering, but occiput flatly convex.

Prothorax one-fourth covered by head, sides strongly convex, posterior margin nearly straight, and with one long hair inside the prominent spiracle.

Pterothorax about equal in length to prothorax, with sides slightly divergent and sinuate; four submarginal hairs on each side of posterior margin, the three inner ones pustulated. Abdomen rather slender, widening gradually to segment V and with tip bluntly rounded, except for the slightly protruding segment IX. The tergal plates are irregularly shaped, widely separated medially, and from one another in segments III to VIII; paratergal plates narrow, without reentrant heads, and strongly chitinized. Segment I with four long dorsal hairs on each side of posterior margin of tergite; segment II with one hair at angle and four long hairs on posterior margin of tergal sclerite; segment III with one short and two long hairs in posterior angle and four dorsal hairs on tergites; segment IV with two hairs in angle and five on posterior margin of tergite; segment V with three hairs at angle, three at margin, and two on surface of tergite; segment VI with three hairs at angle and one on margin of tergal plate; segments VII and VIII with three hairs in angle; segment IX with two long and four short hairs on each side of posterior margin. The hairs on the ventral surface are shown on the right side of figure, those on dorsal surface at the left.

Legs as under generic description; claws medium, somewhat blunt at tips. A few short bristles on femora and tibiae and a longish hair on second and third trochanter; all femora and tibiae more or less excavated on underside in posterior portion.

Female very similar to male, except in larger size, but with the antennae of the same length; chaetotaxy quite similar, but tergal plates less irregularly shaped and with the two plates fused medially on segment VIII.

MEASUREMENTS OF TINAMOTAECOLA ANDINAE

Structure	Male		Female	
	Length	Width	Length	Width
Body	1.86	----------	2.17	
Head	0.59	0.48	0.63	0.53
Prothorax	0.22	0.30	0.22	0.30
Pterothorax	0.22	0.39	0.26	0.37
Abdomen	1.00	0.50	1.28	0.61
Antennae	0.26	0.05	0.26	0.06
Basal plate	0.26	0.13	----------	
Paramers	0.18	0.14	----------	
Endomeral plate	0.15	0.07	----------	

Genus PSEUDOLIPEURUS Carriker

PSEUDOLIPEURUS LONGIPES (Piaget)

Lipeurus longipes PIAGET, Les Pédiculines, p. 329, pl. 28, fig. 3, 1880. (Host: *Tinamus obsoletus=Crypturellus o. obsoletus*, Brazil.)

Dr. Hopkins has recently received from Brazil specimens of *P. longipes* taken on *Crypturellus o. obsoletus*, which, when compared with Piaget's types, proved to be identical with them but different from the specimens taken by me on *C. obsoletus punensis*, and which I had redescribed as *P. longipes* (Carriker, 1936, p. 72, pl. 3, figs. 2, 2a, 2b). Dr. Hopkins has transmitted his findings regarding the two forms, making my specimens from *C. o. punensis* the types of a new subspecies (p. 93). He has communicated to me the differences between the two forms, so that I am now able to define clearly the status of the series of specimens of *P. longipes* taken in Mexico on *Tinamus major percautus*, *Crypturellus b. boucardi*, and *C. cinnamomeus sallaei.*

According to Dr. Hopkins, true *longipes* differs from the parasites described by me from *C. obsoletus punensis* as follows:

"The chitinous bars which strengthen the basal plate converge distally distinctly more strongly in Piaget's form; the paramers are decidedly stouter and more strongly bent than in the material from *punensis*, but the most striking difference is that the endomeral plate (of the same type in both forms) is proportionately very much shorter in the material from *C. o. punensis* than in true *longipes;* in the former it is little more than twice as long as broad and occupies slightly more than half (seven-thirteenths) of the longitudinal space between the paramers, whereas in true *longipes* it is rather more than three times as long as broad and occupies nearly three-quarters (nine-thirteenths) of this space. In the form from *C. o. punensis* the female is considerably larger than the male, while the head is decidedly wider in the female than in the male. Neither of these characters holds good

in true *longipes*, the sexes being practically of the same size and with the same width of head."

MEASUREMENTS OF PSEUDOLIPEURUS LONGIPES

Structure	Seven males from *C. b. boucardi* (Mexico)		One male from *C. c. sallaei* (Mexico)		One male from *T. m. percaulus* (Mexico)	
	Length	Width	Length	Width	Length	Width
Body	2.15–2.25		2.15		2.28	
Head	0.51–0.53	0.37–0.38	0.49	0.37	0.53	0.38
Thorax	0.51–0.54	0.35–0.38	0.52	0.26	0.53	0.27
Abdomen	1.28–1.34	0.41–0.45	1.28	0.39	1.34	0.45
Antennae	0.36–0.39		0.38		0.39	
Paramers	0.191–0.20		0.20		0.194	
Paramers at base		0.10–0.107				0.117
Endomeres	0.135–0.143	0.053–0.056	0.138	0.051	0.138	0.061

Structure	One male from *C. o. obsoletus* (Brazil) (after Piaget)		Two specimens from *C. o. punensis* (Bolivia)			
			Male		Female	
	Length	Width	Length	Width	Length	Width
Body	1.90		1.95		2.06	
Head	0.44	0.33	0.48	0.335	0.53	0.42
Thorax	0.40	0.33	0.45	0.305	0.47	0.41
Abdomen	1.01	0.38	1.17	0.30	1.25	0.48
Antennae	0.28		0.31		0.34	
Paramers			0.191	0.11		
Endomeres			0.138	0.059		

From the foregoing measurements it is obvious that the specimens from *C. o. punensis* do not fall within the extremes of the measurements of any of the Mexican material, while the genitalia differ in shape, although to no great extent in measurements, except for the width at base of paramers.

The paramers are, however, thin toward the base and much thickened and rounded at the tips (circular), while in the Mexican material they are not only thicker at the base, but also thicker in the median portion and are bent more sharply toward the rapidly tapering tips, while the contour of the outer margin (on the bent apical portion) is concave, not convex, as in the specimens from *C. o. punensis*.

We have, therefore, in the Mexican material, a genital armature which, in its longitudinal proportions, resembles that of the specimens from *C. o. punensis*, while the shape of the paramers is that of *P. l. longipes* (Piaget); the body measurements are much greater and of different proportions than either *P. l. longipes* or the specimens from *C. o. punensis*, but with the female larger than the male and with the

temples wider in the female than in the male, precisely as in the specimens from *C. o. punensis*.

The parasites from *C. b. boucardi* are therefore entitled to subspecific rank, and the single male taken on *C. cinnamomeus sallaei* must go along with them, since practically all of its body measurements are within the extremes given for the material from *boucardi*, while the genital armature is even closer.

Had there been the slightest possibility of straggling, I would say that *C. cinnamomeus sallaei* is not the true host of this single male, but since the specimen of *C. c. sallaei* was shot prior to the taking of any birds of *C. b. boucardi*, all thought of straggling is eliminated. The single male taken on *Tinamus major percautus* also obviously belongs to that host and is very close to the specimens from *C. b. boucardi*, especially in its body measurements, all of them except two falling within the extremes for the *boucardi* material. However, the genital armature is not the same, and this, after all, is the safest character to use in this group. In addition, the shape of the last abdominal segments differs, and so it seems advisable to give this specimen subspecific rank.

We therefore have the following arrangement of the races of *P. longipes* and their respective hosts:

PSEUDOLIPEURUS LONGIPES LONGIPES (Piaget)

Lipeurus longipes PIAGET, Les Pédiculines, p. 329, pl. 28, fig. 3, 1880. (Host: *Tinamus obsoletus=Crypturellus o. obsoletus*, Brazil.)

PSEUDOLIPEURUS LONGIPES SIMILIS, new subspecies

FIGURE 2, *b*

Types.—Male and female, adults, from *Crypturellus b. boucardi*, collected by the author on Cerro Tuxtla, Veracruz, Mexico, March 28, 1940; in U. S. National Museum.

Differs from *P. l. longipes* and *P. l. carrikeri* in much smaller size and in size and proportion of the male genitalia and also from *P. l. longipes* in sexual dimorphism (see previous discussion).

A single male of this race was also taken on *Crypturellus cinnamomeus sallaei*, shot at Tres Zapotes, Veracruz, Mexico, on March 27, 1940.

PSEUDOLIPEURUS LONGIPES ROBUSTUS, new subspecies

FIGURE 2, *a*

Type.—Male, adult, the only specimen, taken on *Tinamus major percautus*, collected on Cerro Tuxtla, Veracruz, Mexico, by the author on March 23, 1940; in U. S. National Museum.

Very similar to *P. l. similis* in size and appearance, but differs from it as follows: Basal plate and genital armature considerably wider, with endomeral plate larger and of different shape (see fig.), and with paramers thicker toward their tips and less tapering; posterior pair of femora and tibiae longer, but middle pair shorter.

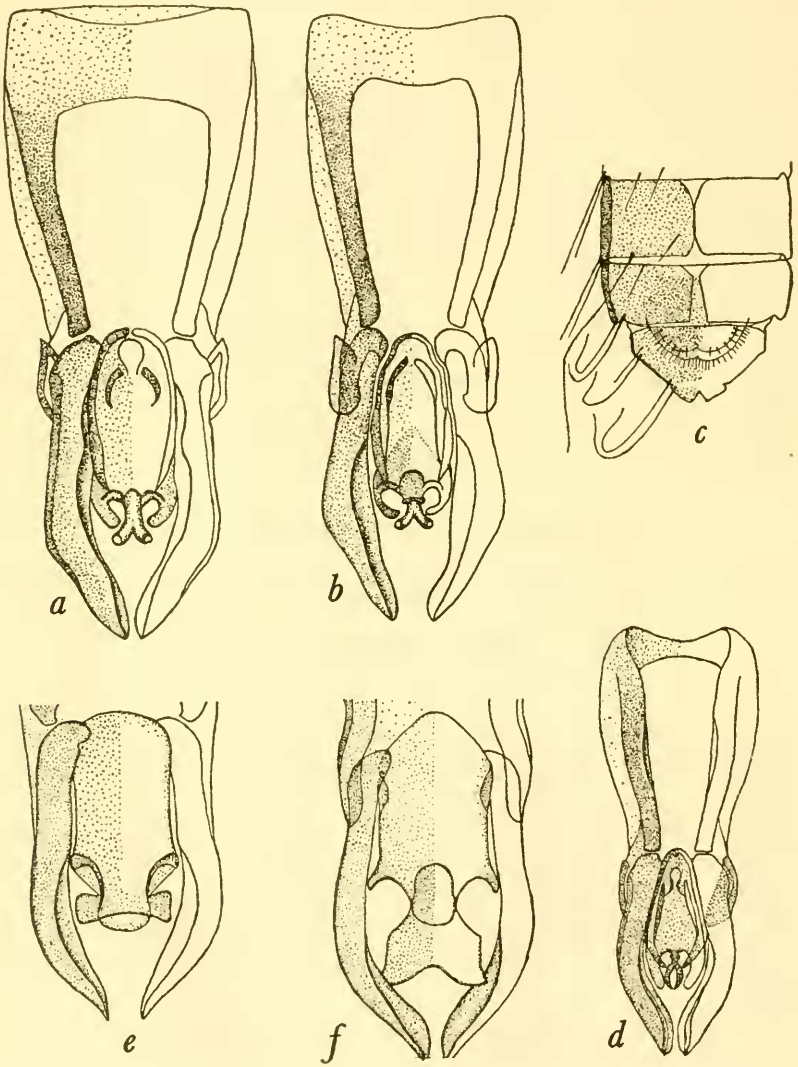

FIGURE 2.—PSEUDOLIPEURUS

a, *Pseudolipeurus longipes robustus*, new subspecies: Male genitalia.
b, *P. l. similis*, new subspecies: Male genitalia.
c, *d*, *P. l. garleppi*, new subspecies: *c*, Female abdomen; *d*, male genitalia.
e, *P. tinami tinami* (Carriker): Male genitalia.
f, *P. t. serratae*, new subspecies: Male genitalia.

PSEUDOLIPEURUS LONGIPES GARLEPPI, new subspecies

FIGURE 2, *c*, *d*

Types—Male and female, adults, from *Crypturellus garleppi affinis*, collected at Todos Santos, Río Chaparé, Bolivia, by the author on August 11, 1937; in collection of author.

Diagnosis.—This race is very close to *P. l. carrikeri*, from *Crypturellus obsoletus punensis*, in body structure but differs rather strongly in the shape and proportions of the genital armature. The female is considerably larger than the male, but the head is no wider at the temples. The measurements as compared with those given by Piaget for *longipes* show: Length considerably more (2.08 against 1.90); head 0.44 by 0.33 against 0.49 by 0.35; thorax longer, but same width; abdomen longer and narrower; antennae longer (0.32 against 0.28).

Compared with *P. l. carrikeri* we have: Size much larger in both sexes, with cephalic index quite different (male, 1.04 against 1.43; female, 1.33 against 1.26); abdomen longer and wider, but thorax nearly the same. The proportions of the male genitalia are very close, but all component parts are of different shape (paramers 0.195 by 0.11 against 0.191 by 0.11; endomeral plate 0.14 by 0.065 against 0.138 by 0.059).

MEASUREMENTS OF PSEUDOLIPEURUS LONGIPES GARLEPPI

Structure	Male		Female	
	Length	Width	Length	Width
Body	2.08	----------	2.45	
Head	0.49	0.35	0.52	0.39
Prothorax	0.18	0.25	0.205	0.24
Pterothorax	0.32	0.33	0.32	0.37
Abdomen	1.28	0.32	1.47	0.40
Third femur	0.48	0.11	0.456	0.12
Antennae	0.32	0.046	0.35	0.043
Basal plate	0.22	0.12	----------	
Paramers	0.195	0.11	----------	
Endomeres	0.14	0.065	----------	

PSEUDOLIPEURUS LONGIPES CARRIKERI Hopkins, new subspecies

FIGURE 4, *d*

Pseudolipeurus longipes CARRIKER, Lice of the tinamous, p. 72, pl. 3, figs. 2–2b, 1936 (not Piaget). (Host: *Crypturellus obsoletus punensis*.)

The following description of this race is from the manuscript prepared by Dr. G. H. E. Hopkins and kindly sent to me for incorporation in the present review of the group:

"Piaget (1880, p. 329, pl. 28, fig. 3) describes and figures *Lipeurus longipes* from a male found on a skin of *Tinamus obsoletus* in the

Leyden Museum. Carriker (1936, p. 72, pl. 3, fig. 2) redescribes what he took to be the same form from *Crypturellus obsoletus punensis* from Peru and Bolivia, though noting that Piaget's type was probably from the Brazilian form of the host (*C. o. obsoletus*) and might prove slightly different; he placed the species in his new genus *Pseudolipeurus*. Clay (1937, p. 133) compared Piaget's type with Carriker's figure and found that in the type the hyaline frontal margin is bilobed, whereas Carriker's figure shows it entire. She was unable to decide whether the difference should be considered subspecific owing to the absence of adequate material.

"Recently I received from Prof. Plaumann a collection of Mallophaga taken on *Crypturellus o. obsoletus* (Temminck) in south Brazil, which included a good series of *Pseudolipeurus longipes* (Piaget). All these specimens have the frontal margin bilobed as in Piaget's type and Miss Clay kindly compared one of the males with Piaget's type and found it to be identical. Meanwhile Mr. Carriker has most kindly sent me two males and two females comprising the whole of the material from which he redescribed the species, except the single male from Calabatea, Bolivia, which is no longer in his possession. In all these specimens the hyaline frontal margin is practically straight, but in all of them it has a somewhat folded and collapsed appearance, and so I am unable to satisfy myself that the apparent absence of the two lobes is genuine. But there are other differences between the two forms, some of which appear to be constant, which convince me that they are subspecifically distinct.

"The most important difference is in the form of the male genitalia: The chitinous bars which strengthen the basal plate converge distally more strongly than in Piaget's form and the paramers are decidedly stouter and more strongly bent than in the material from *C. o. punensis*, but the most striking difference is that the endomeral plate (of the same type in both forms) is proportionally very much shorter in the material from *C. o. punensis* than in true *longipes;* in the former it is little more than twice as long as broad and occupies slightly more than half (seven-thirteenths) of the longitudinal space between the paramers, whereas in true *longipes* it is rather more than three times as long as broad and occupies three-quarters (nine-thirteenths) of this space. Carriker has drawn attention (1936, p. 72) to the fact that in his form the head is decidedly narrower in the male than in the female, and that the female is much longer than the male. Neither of these observations is true of *longipes*, in which the sexes are almost exactly the same size and the cervical index is 1.33 in both sexes. The two pairs from *C. o. punensis* are by no means uniform in either of these respects, and I am not convinced that we are not dealing with three subspecies instead of two, but in

the absence of more material it is safer to consider the two pairs from this host to be of one form; in each pair the head is narrower in the male than in the female, and the female is much the larger insect. In the pair from Bolivia the cervical index is 1.5 in the male and 1.3 in the female, and the total length is 1.95 mm. in the male and 2.03 in the female. In the Peruvian pair the cervical index is 1.3 in the male and 1.25 in the female, and the total length is 2.20 in the male and 2.61 in the female. In true *longipes* the cervical index is 1.33 in both sexes and the difference in total length is trivial (male 2.37; female 2.47).

"I have much pleasure in naming Mr. Carriker's form *Pseudolipeurus longipes carrikeri*. The holotype male and allotype female (on one slide) are from *Crypturellus obsoletus punensis* (Chubb), Sandillani, Dept. La Paz, Bolivia, November 25, 1934, and have been returned to Mr. Carriker. The pair of paratypes which Mr. Carriker has very generously permitted me to retain are from the same host, La Oroya, Peru, June 6 and 12, 1931. All specimens were collected by Mr. Carriker.

"The fact that my males from *C. o. obsoletus* agree perfectly with Piaget's type strongly supports the suggestion that the type of *Pseudolipeurus l. longipes* (Piaget) came from the nominate form of the host."

Remarks.—Dr. Hopkins notes that his measurements are not the same as published by me for the specimens under discussion and suggests that they were made from the projection of the image of the specimen, with a rule obtained by projecting a stage micrometer at the same distance from the projector and tracing the image on paper. However, I wish to take this opportunity of stating that *all* the measurements published by me in 1936 were made directly from the insect by means of an eyepiece micrometer calibrated to the magnification used. The error he mentions in the measurements, or rather the difference, was due to a mistake made by me in the calibration of my eyepiece micrometer; *all* the measurements given in my "Lice of the Tinamous," 1936, present the same error. A true correction may be obtained by multiplying all the measurements by the constant 1.084.

PSEUDOLIPEURUS TAOI PERUVIANUS, new subspecies

Type.—Female, adult, from *Tinamus tao kleei*, collected by the author at La Pampa, Peru, July 5, 1931; in collection of author.

This race is based on a single female (the type), which was previously identified as *P. taoi* Carriker. A careful study of the additional material from *T. t. tao*, collected in Colombia, together with the single female from *T. tao kleei*, shows that the Peruvian insect is not the same and deserves subspecific rank.

Unfortunately no male was taken, but the characters shown by the female, although not strikingly different, seem to be of subspecific value.

The measurements are considerably greater in all respects, while the cephalic index remains the same; the head is wider at the base of the trabeculae and at the *frons* (in proportion to the width at the temples); the sides of the prothorax and the occipital margin of the head are more emarginate; the tergal plates are wider, being but slightly separated medially, while in *taoi* they are separated by a hyaline space two-thirds the width of the paratergal plates; the paratergals are much narrower (half the width); the last abdominal segment is much wider at its anterior end, with sides more converging, while the chaetotaxy of this segment is some different.

MEASUREMENTS OF TWO RACES OF PSEUDOLIPEURUS TAOI

Structure	*taoi* (females)		*peruvianus* (female)	
	Length	Width	Length	Width
Body	1.80–1.94		2.10	
Head, trabeculae	0.46–0.51	...–0.27	0.53	0.30
Head, temples		0.38–0.43		0.44
Prothorax	...–0.18	0.24–0.25	0.22	0.29
Pterothorax	0.25–0.28	0.33–0.37	0.32	0.41
Abdomen	1.08–1.17	0.37–0.44	1.26	0.49
Antennae	0.31–0.32	...–0.043	0.36	0.045

PSEUDOLIPEURUS TINAMI TINAMI (Carriker)

FIGURE 2, *e*

Lipeurus longipes tinami CARRIKER, Univ. Nebraska Stud., vol. 3, No. 2, p. 146, pl. 3, fig. 3, 1903. (Host: *Tinamus robustus=T. major castaneiceps*, from Pozo Azul, Costa Rica.)

Esthiopterum tinami (Carriker) HARRISON, The genera and species of Mallophaga, p. 143, 1916.

Pseudolipeurus tinami (Carriker) CARRIKER, Lice of the tinamous, p. 69, pl. 2, figs. 2, 2a, 1936.

Numerous males and females were taken on *Tinamus major percautus* collected on Cerro Tuxtla and at Tres Zapotes, Veracruz, Mexico, by the author in 1940.

The Mexican specimens are very close to the types from Costa Rica, but there are certain slight differences as follows: Total length in both sexes slightly greater; head of male some longer (0.48 against 0.52) but not wider; in the female it is both longer and wider; prothorax in both sexes the same length, but slightly narrower; pterothorax almost same in male, larger in female; abdomen longer in both sexes, scarcely wider in male but considerably wider in female; the antennae

slightly shorter and thicker in both sexes; hyaline frontal margin bilobed in both forms but wider in Mexican specimens.

If we consider the wide range of individual variation present in this genus, these differences do not seem to be of sufficient extent or importance to warrant the separation of the Mexican parasites. I have found other species of Mallophaga to be the same on both *Tinamus major castaneiceps* and *T. m. percautus*.

PSEUDOLIPEURUS TINAMI SERRATAE, new subspecies

FIGURE 2, *f*

Type.—Male, adult, from *Tinamus s. serratus*, collected by the author at Todos Santos, Río Chaparé, Bolivia, September 9, 1937; in collection of author.

Diagnosis.—In general appearance very close to *P. t. tinami* but slightly smaller in all body dimensions (see table of measurements) except the genitalia, which are actually larger (paramers, 0.16 by 0.097 against 0.14 by 0.09; endomeral plate, 0.14 long against 0.11).

The temples are less rounded, running almost straight back from the eye to the rounded posterior angle, and not uniformly curving as in *tinami*. The most striking differences between *serratae* and *tinami* are the shape of the endomeral plate and the longer, slenderer paramers, with thicker ends (see figures). The genital armature in this genus furnishes excellent characters for the separation of species and subspecies.

MEASUREMENTS OF THE TYPE (MALE) OF PSEUDOLIPEURUS TINAMI SERRATAE

Structure	Length	Width
Body	1.74	
Head: frons		0.26
Head: temples	0.46	0.39
Prothorax	0.18	0.24
Pterothorax: front	0.27	0.29
Pterothorax: rear		0.38
Abdomen	1.02	0.32
Antennae	0.38	0.045
Paramers	0.16	0.097
Endomeral plate	0.14	

This race of *tinami* differs more from the nominate form than does *P. t. ruficeps*, especially in the shape of the temples and the endomeral plate. *Tinamus major* and its races are very closely related to the *T. serratus* group, so much so that there has been uncertainty as to which group the Colombian bird, *T. s. ruficeps*, should be allocated, some authors having placed it under *major*. The close relationship

between the *Pseudolipeurus* parasites of these two avian species corroborates this fact and would lead one to believe that *ruficeps* might well be conspecific with *major* rather than with *serratus*, or that *major* and *serratus* were also conspecific. Three males, including the type, were taken, but no females.

PSEUDOLIPEURUS TINAMI RUFICEPS, new subspecies

FIGURE 3, *a–c*

Types.—Male and female, adults, from *Tinamus serratus ruficeps*, collected by the author at El Bosque, Sierra Perijá, Colombia, June 14, 1941; types in U. S. National Museum.

Diagnosis.—General shape of head and body and male genital armature similar to those of *P. t. tinami*, differing in proportions only.

In the male the total length is less, the head is slightly shorter but considerably narrower; the prothorax of same length but much narrower; pterothorax also much narrower; the antennae as well as the third femur slightly smaller; the basal plate longer and narrower, and the paramers longer and slenderer apically; the endomeral plate, basal plate, and paramers are of slightly different shape.

The female is also smaller than the female of *tinami*, but the porportions are not the same as in the male (see table of measurements). Two males and two females (including the types) were taken. Another individual of this host failed to yield parasites of the species.

MEASUREMENTS OF PSEUDOLIPEURUS TINAMI RUFICEPS

Structure	Male		Female	
	Length	Width	Length	Width
Body	1.74	----------	1.80	
Head	0.466	0.357	0.487	0.395
Prothorax	0.19	0.227	0.174	0.25
Pterothorax	0.26	0.305	0.25	0.35
Abdomen	0.98	0.303	1.05	0.32
Antennae (segment 1)	0.11	0.045	0.053	0.04
Antennae (segment 2)	0.087	0.03	0.097	0.02
Basal plate	0.195	0.087	----------	
Paramers	0.15	0.09	----------	
Third femur	0.41	0.11	0.39	0.11
Antennae (total)	0.347	----------	0.32	

PSEUDOLIPEURUS SANCTAE-MARTAE, new species

FIGURE 3, *d–g*

Types.—Male and female, adults, from *Crypturellus idoneus*, collected by the author at El Bosque, Sierra Perijá, Colombia, June 14, 1941; in U. S. National Museum.

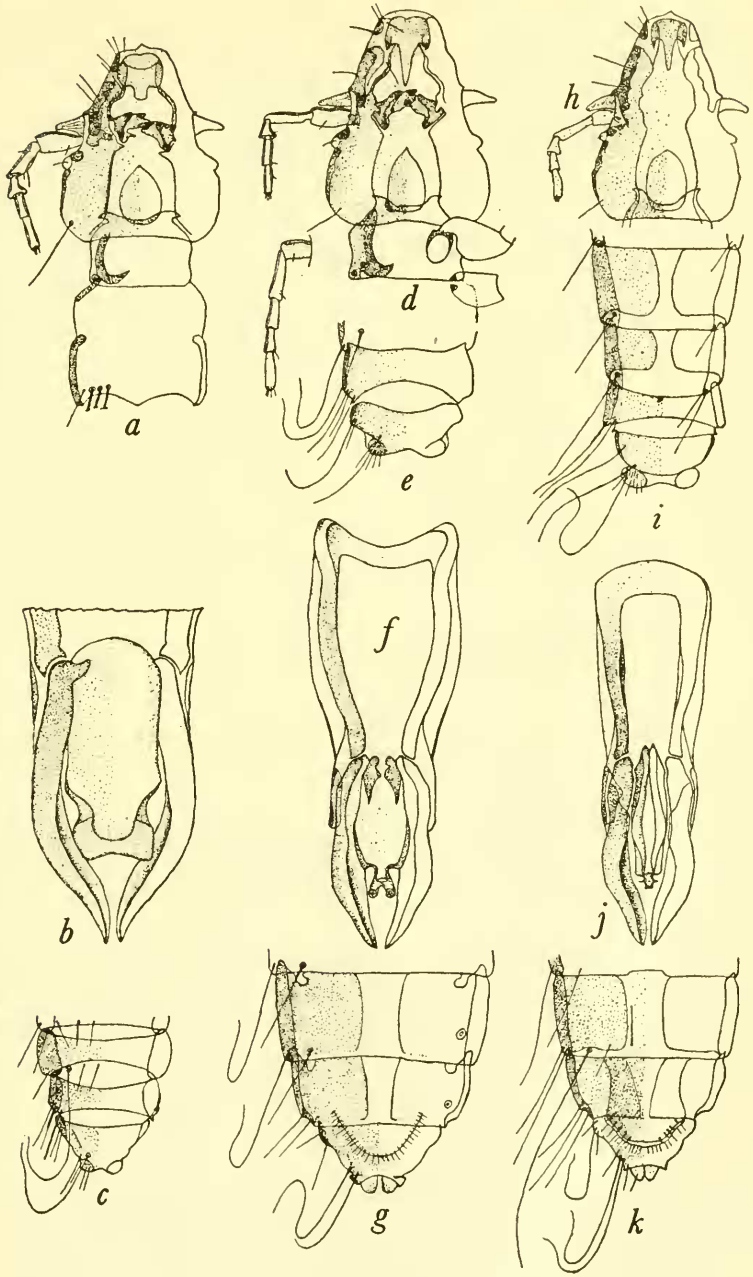

FIGURE 3.—PSEUDOLIPEURUS

a–c, *Pseudolipeurus tinami ruficeps*, new subspecies: *a*, Male head and thorax; *b*, male genitalia; *c*, tip of female abdomen.

d–g, *P. sanctae-martae*, new species: *d*, Male head and thorax; *e*, female antennae and tip of male abdomen; *f*, male genitalia; *g*, tip of female abdomen.

h–k. *P. tataupicola*, new species: *h*, Male head; *i*, tip of male abdomen; *j*, male genitalia; *k*, tip of female abdomen.

Diagnosis.—Nearest to *P. longipes* (Piaget) in general shape of head and clypeal signature, but the antennae are quite different. In *longipes* there is almost no dimorphism in the antennae, while in the new species they are strongly dimorphic; the tip of the abdomen in the male strongly resembles that of *P. subsimilis*, while the male genital armature is nearest to the type of *longipes*, but very different as to detail.

MEASUREMENTS OF PSEUDOLIPEURUS SANCTAE-MARTAE

Structure	Male		Female	
	Length	Width	Length	Width
Body	2.10		2.41	
Head	0.50	0.37	0.53	0.41
Prothorax	0.18	0.24	0.19	0.28
Pterothorax	0.33	0.36	0.37	0.41
Abdomen	1.28	0.35	1.50	0.51
Antennae	0.36	0.04	0.36	0.04
Third femur	0.52	0.13	0.50	0.14
Basal plate	0.25	0.13		
Paramers	0.20	0.11		

PSEUDOLIPEURUS TATAUPICOLA, new species

FIGURE 3, *h–k*

Types.—Male and female, adults, from *Crypturellus t. tataupa*, collected by the author at Río Lipeo, Bolivia, August 9, 1938; in collection of the author.

Diagnosis.—This species, while having characters in common with several others, seems to differ considerably from all the known forms, just as its host is radically different from the other species of the genus.

The shape of the head is between that of the long, slender-headed *longipes* and the short, wide head of *tinami* and *grandis*. The chaetotaxy of the last four abdominal segments in the male differs radically from that of the female and from the other species of the genus. The structure of the pleural plates in the male also is rather unusual, especially in segments III to VI, the posterior portion being incised on the dorsal surface (see fig.).

The antennae are very slightly dimorphic, with the first segment in the male practically equal to that of the female and *shorter than the trabeculae*. The genital plate in the female resembles, in shape, that of *genitalis* and *grandis*, with the double fringe of setae around the posterior margin very close to *grandis*. The clypeal signature, while resembling several other forms of the genus, is slightly different from all, as is also the shape of the gular plate.

The male genital armature is, however, the most striking of the distinctive characters of the species. The basal plate is nearest to that of *longipes*, yet not the same, while the massive paramers are more or less of the same type as in *grandis*, *sanctae-martae*, and *subsimilis*, but the endomeral plate is unique for this genus in the structure of its posterior portion. The pair of "claspers" found in *grandis* and *longipes* is entirely absent, as well as the bifurcated penis of *longipes* and *sanctae-martae*, that organ being furnished with a *row of spines* near the tip.

MEASUREMENTS OF PSEUDOLIPEURUS TATAUPICOLA

Structure	Male		Female	
	Length	Width	Length	Width
Body	1.97	----------	2.20	
Head	0.46	0.33	0.49	0.36
Prothorax	0.16	0.20	0.17	0.23
Pterothorax	0.27	0.30	0.29	0.30
Abdomen	1.30	0.33	1.43	0.42
Antennae	0.28	0.03	0.27	0.04
Third femur	0.38	0.097	0.40	0.097
Basal plate	0.20	0.11	----------	
Paramers	0.20	0.10	----------	

PSEUDOLIPEURUS GRANDIS Carriker

FIGURE 4, *a–c*

Pseudolipeurus grandis CARRIKER, Lice of the tinamous, p. 73, pl. 3, figs. 1, 1a, 1936. (Host: *Nothocercus nigrocapillus*.)

This species was described from a single female taken on *N. n. nigrocapillus* from Sandillani, Bolivia. In 1941 five females and a male of this species were taken from *Nothocercus bonaparti*, in the Sierra Perijá of Colombia. The five females are almost identical with the type of *grandis*, there being but insignificant differences in measurements, and so until the male can be examined from the type host (*N. nigrocapillus*) I prefer to use the name *P. grandis* for these specimens from *N. bonaparti*.

Should the male from *N. n. nigrocapillus* prove to be different from the male here figured (from *N. bonaparti*), then the specimens from the latter host will have to be named, but I doubt very much whether they will prove to be even subspecifically different.

Diagnosis of male.—In this species there is an unusual discrepancy in size between the sexes, not only in the length and width of the abdomen but also in all the body segments. The cephalic index in the female is slightly less than in the male, the temples being wider. There

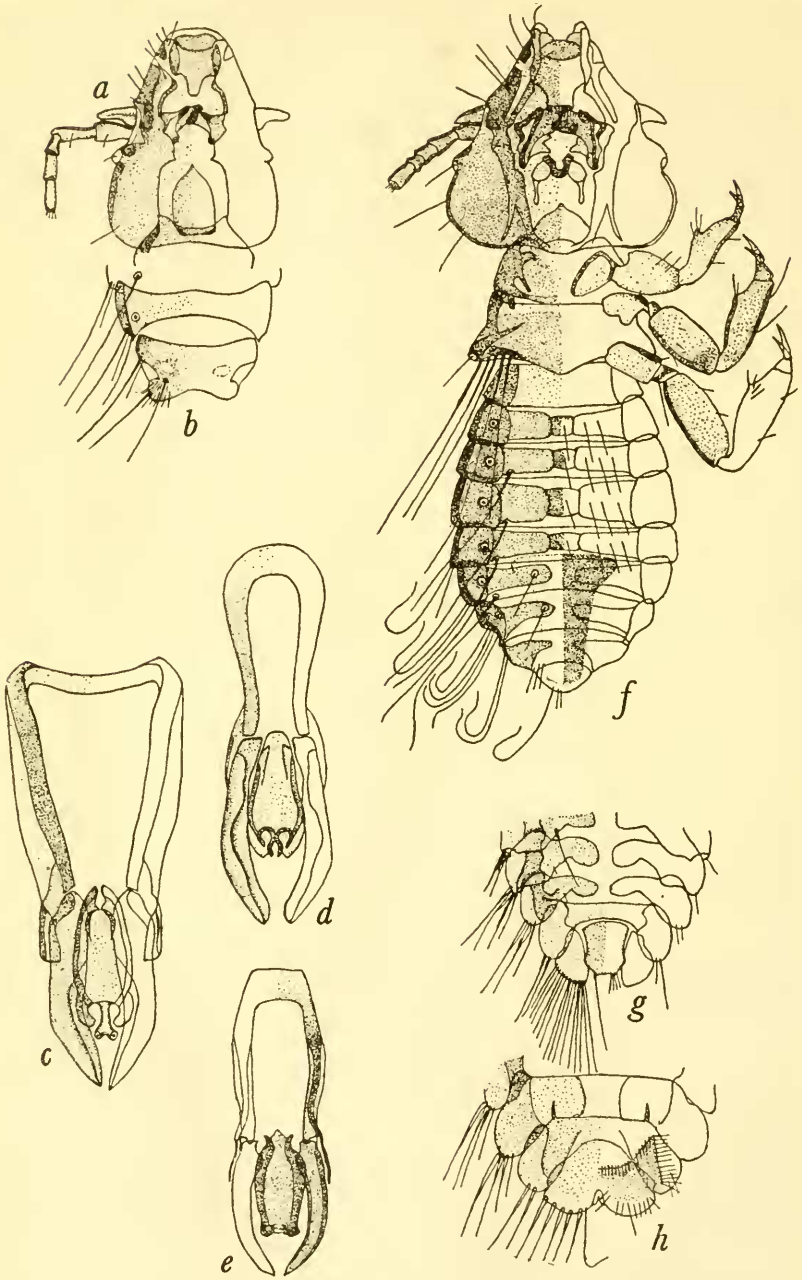

FIGURE 4.—PSEUDOLIPEURUS, PSEUDOPHILOPTERUS, AND STRONGYLOCOTES

a–c. Pseudolipeurus grandis Carriker: *a*, Male head; *b*, tip of male abdomen; *c*, male genitalia.
d, *P. longipes carrikeri* Hopkins, new subspecies: Male genitalia.
e, *f*, *Pseudophilopterus hirsutus similis*, new subspecies: *e*, Male genitalia; *f*, body of male.
g, *h*, *Strongylocotes subconiceps perijae*, new subspecies: *g*, Tip of male abdomen; *h*, tip of female abdomen.

is a slight dimorphism in the antennae, the first segment in the male being much larger than in the female (about equal to the second), while the third is slightly conical in shape and attached somewhat latterly to the second.

In this species, like others of the genus, the tergal plates are widely separated medially in the female, while in the male they are united, but not fused. The male genitalia have the endomeral plate and penis resembling those of *longipes*, but the basal plate is similar to that of *genitalis* and *subsimilis*. Flaps extend from each side of the basal plate downward along the sides of the paramers, giving added lateral support. The paramers are heavy and pointed, also resembling those of *genitalis;* the penis is bifurcated, and has lateral protecting flaps attached to the end of the endomeral plate.

MEASUREMENTS OF PSEUDOLIPEURUS GRANDIS

Structure	From *Nothocercus bonaparti* (Colombia)				Type female from *N. nigrocapillus* (Bolivia) (corrected)	
	Male		Female		Length	Width
	Length	Width	Length	Width		
Body	2.15		2.93		2.92	
Head	0.50	0.37	0.66	0.50	0.63	0.49
Prothorax	0.19	0.25	0.26	0.33	0.24	0.31
Pterothorax	0.34	0.37	0.44	0.57	0.41	0.49
Abdomen	1.30	0.38	1.76	0.65	1.78	0.58
Third femur	0.52	0.13	0.62	0.15	0.56	0.13
Antennae	0.37	0.046	0.46	0.053	0.41	
Basal plate	0.25	0.18				
Paramers	0.21	0.11				

Genus PSEUDOPHILOPTERUS Carriker

PSEUDOPHILOPTERUS HIRSUTUS SIMILIS, new subspecies

FIGURE 4, *e*, *f*

Types.—Male and female, adults, from *Crypturellus cinnamomeus sallaei*, collected by the author at Tres Zapotes, Veracruz, Mexico, March 27, 1940; in U. S. National Museum.

Diagnosis.—Male: The general shape of the head is similar to that of *hirsutus*, with broadly rounded temples and convex occiput, but the preantennary area has the sides more deeply concave and the frons wider. The antennae are shorter and thicker in both sexes; the trabeculae are longer, and the hairs on the preantennary area are *much* longer, as in *P. hirsutus obsoletus*.

The prothorax is short, as in *hirsutus*, but with the strongly convex sides more convergent anteriorly. The pterothorax is wider, more

angulated on the posterior margin, and more constricted laterally in anterior portion. The abdomen is more oval in shape, more broadly rounded posteriorly, with the last segment shorter and wider. The pleural and tergal plates are similar, but the former are more deeply pigmented and the darker markings are reduced to a *single* band along the lateral margin.

The general chaetotaxy is similar, but the hairs are longer throughout, while there is an additional long, pustulated hair at the inner edge of pleurite IV, on the posterior margin of the sclerite, similar to those on segments V and VI in *hirsutus*. The pigmented bands along the sides of the second and third pairs of femora are much narrower, and the femora are more swollen (less parallel-sided). The genitalia are similar to those of *P. h. obsoletus*, rather than of *hirsutus*.

The female is much like the male in most respects but is slightly larger, and, unlike *hirsutus*, the abdomen is similar in shape to the male, not long and slender. There are heavy, long, pustulated hairs at the inner, posterior corner of pleurites II and III, which are absent in the male.

MEASUREMENTS OF PSEUDOPHILOPTERUS HIRSUTUS

Structure	*hirsutus*				*similis*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.35		1.49		1.36		1.54	
Head	0.50	0.47	0.50	0.51	0.52	0.50	0.52	0.53
Prothorax	0.14	0.26	0.16	0.27	0.17	0.29	0.15	0.326
Pterothorax	0.12	0.32	0.13	0.31	0.13	0.41	0.14	0.41
Abdomen	0.69	0.38	0.95	0.44	0.67	0.49	0.79	0.52
Antennae	0.25		0.26		0.24		0.22	
Paramers	0.133	0.107			0.14	0.108		
Endomeral plate	0.087	0.066			0.097	0.053		
Basal plate	0.23	0.117			0.17	0.09		

Family HEPTAPSOGASTRIDAE Carriker

Subfamily STRONGYLOCOTINAE Carriker

Genus STRONGYLOCOTES Taschenberg

STRONGYLOCOTES COMPLANATUS INTERMEDIUS, new subspecies

Strongylocotes complanatus complanatus (Piaget) CARRIKER, Lice of the tinamous, p. 84, pl. 6, figs. 2–2b, 1936.

Types.—Male and female, adults, from *Crypturellus obsoletus ochraceiventris*, collected by the author at Eneñas, Dept. Junín, Peru, March 12, 1930; in collection of the author.

Specimens of *Strongylocotes complanatus* from *Crypturellus obsoletus punensis* and *C. o. ochraceiventris* were considered by Carriker (1936) to be the same. Since then I have secured additional material from *C. o. punensis* and also, through the courtesy of Dr. Hopkins, authentic specimens of *S. c. complanatus* (Piaget) from *Crypturellus o. obsoletus,* collected at Novo Teutonia, Brazil.

A careful study of all this material has resulted in the discovery not only that the specimens of *S. complanatus* from *C. obsoletus punensis* and *C. o. ochraceiventris* are very different from true *complanatus*, but also that those from *C. obsoletus punensis* are different from both of the others.

The parasites from *C. o. ochraceiventris* are without a name and are described below as *Strongylocotes complanatus intermedius.* However, there is a name available for those taken on *C. obsoletus punensis*, since the species described by Carriker (1936, p. 80) as *Nirmocotes nirmoides* from *C. obsoletus punensis* has proved to be the immature of *Strongylocotes*, and a description of the adult follows that of *S. c. intermedius.*

Diagnosis of S. c. intermedius.—The head of the male in true *complanatus* is longer and narrower at the temples; the sides of the thorax are quite straight (not slightly concave) and have a pronounced "tooth" at the anterolateral angle; the mesothorax seems to be the same, but the metathoracic apron has the sides more convex and the posterior margin slightly concave. The abdomen is longer and is narrower at the third and fourth segments, while the abrupt narrowing of the fifth segment is much less pronounced, so that in this character *intermedius* is intermediate between true *complanatus* and *S. c. interruptus* Carriker. The pair of "segments" lying alongside the last abdominal segment are also of different shape, having the posterior margin more oblique (less transverse), while the whole segment is differently shaped. The wide, deeply pigmented, longitudinal band along the inner edge of the pleural plates, so noticeable in the male of *intermedius*, is entirely absent in the male of *complanatus*, although present in the female (as in *S. pellucidifrons*, new species). In the male of *complanatus* a darker band is present along the outer edge of the pleural plates, while the remaining area is unicolored, but in the female the reverse is true. In *intermedius* the male has both the marginal and inner bands, while in the female only the submarginal one is present.

There is a slight difference in the shape of the paramers, those of *complanatus* being uniformly convex on the outer margin, while in *intermedius* they are concave medially, then curving together at the tips.

In *complanatus* there is a marked difference between the sexes in the shape of the head. The male has the front much flattened, while in

the female it is narrower and decidedly rounded. The temples are very little wider in the female but much more angulated, the posterior half of the sides being much more flattened. In *intermedius* the front is equal in the sexes, but the temples are more flattened posteriorly in the female. There is also a decided difference in the shape and chaetotaxy of the last abdominal segment in the female. Each side of the posterior margin is much more rounded, almost circular in shape, while the *thickened* hairs along the margin are fewer and much shorter, but the fine, intermediate hairs are still *finer* and shorter. The sides of this segment in *complanatus* are also much more rounded and the anterior end less pointed. The remaining abdominal chaetotaxy is the same.

MEASUREMENTS OF STRONGYLOCOTES COMPLANATUS

Structure	*complanatus*				*intermedius*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	2.67	-------	2.89	-------	2.95	-------	3.23	
Head	0.74	0.69	0.77	0.66	0.84	0.69	0.87	0.70
Prothorax	0.34	0.51	0.35	0.51	0.36	0.54	0.39	0.54
Mesothorax	0.48	0.76	0.54	0.76	0.52	0.83	0.52	0.79
Metathorax	0.27	0.50	0.28	0.50	0.24	0.55	0.28	0.56
Abdomen	1.43	1.27	1.65	1.29	1.60	1.10	1.82	1.28
Antennae	0.50	-------	0.45	-------	0.50	-------	0.46	

STRONGYLOCOTES COMPLANATUS NIRMOIDES (Carriker)

Nirmocotes nirmoides CARRIKER, Lice of the tinamous, p. 80, pl. 4, fig. 3, 1936. (Host: *Crypturellus obsoletus punensis.*)

Diagnosis of lectotype.—The preantennal portion of the head is longer in the female and shorter in the male than in *intermedius*, with the same width at frons in both sexes of both races, but wider at the base in the female of *nirmoides;* in the male the anterior angles of the prothorax are rounded, with the lateral notch obsolete, while in the female they are angulated as in *both sexes* of *intermedius*, but in *intermedius* the lateral notch is present in both sexes. The sides of the prothorax in *nirmoides* are less emarginate and more divergent, the difference in width between the anterior and posterior margins being 0.065 mm. in *nirmoides* and 0.033 mm. in *intermedius.*

The terminal segments of the abdomen in the male (that is, the last median segment and the ones on each side of it) are differently shaped, while there is a much abrupter narrowing of the abdomen at segment V, more nearly approximating *S. c. interruptus* in this character, although in all other respects it is nearer to *intermedius.*

The male genitalia seem to be identical in the two subspecies. The total length in both sexes is greater in *intermedius;* the head is much shorter but of the same width at the temples (0.76 by 0.69 against 0.84 by 0.69) ; the abdomen in both sexes is shorter but not wider.

As compared with *S. c. complanatus*, the total length is somewhat greater, with head about the same in the male but considerably longer in the female. However, the shape of the abdomen in the male separates at a glance the race of *complanatus*, there being no trace of the abrupt narrowing of the abdomen at segment V, while the shape of the terminal segments is quite different. In regard to the abrupt narrowing of the abdomen at segment V in the males of these races of *complanatus*, we have the extreme of this character in *interruptus*, to a less degree in *nirmoides*, still less in *intermedius*, and none at all in *complanatus.*

MEASUREMENTS OF STRONGYLOCOTES COMPLANATUS NIRMOIDES

Structure	Male		Female	
	Length	Width	Length	Width
Body	2.70		3.08	
Head at trabeculae		0.22		0.24
Head temples	0.76	0.69	0.81	0.70
Prothorax	0.37	0.53	0.37	0.54
Mesothorax	0.52	0.80	0.57	0.84
Metathoracic apron	0.26	0.52	0.29	0.60
Abdomen	1.50	1.28	1.70	1.35
Antennae	0.456	0.065	0.456	0.065
Preantennal region	0.20	0.24 / 0.48	0.25	0.24 / 0.52

STRONGYLOCOTES COMPLANATUS INTERRUPTUS Carriker

Strongylocotes complanatus interruptus CARRIKER, Lice of the tinamous, p. 85, pl. 7, figs. 1, 1a, 1936. (Host: *Crypturellus atrocapillus.*)

Further ornithological collecting in Bolivia by the author revealed the fact that the host of this louse, collected at Chiñiri, Bolivia, was wrongly identified. It proved to be *Crypturellus garleppi affinis*, several additional specimens of which were later taken on the Chaparé River, from which additional series of parasites were taken that proved to be identical with the type series of *S. c. interruptus.*

STRONGYLOCOTES COMPLANATUS BOUCARDI, new subspecies

Types.—Male and female, adults, from *Crypturellus b. boucardi*, collected by the author on Cerro Tuxtla, Veracruz, Mexico, March 28, 1940; in U. S. National Museum.

This race of *complanatus* is close to *interruptus*, having abdominal

segment V abruptly narrower than IV, a character that renders it easily recognizable and that is shared (to the same extent) only by *S. c. interruptus*.

Male: Differs from *interruptus* in having the lines of the sides of the head and temples all slightly convex, while in *interruptus* they are perfectly straight. The aborted segments alongside the last abdominal one are of different shape, less rounded on the posterior margin and less protuberant. The chaetotaxy and the double, longitudinal bands across pleurites I to IV seem to be about the same. Both races have the head narrower at the temples in the female, as well as the *frons* more rounded. In the female of *interruptus* the mesothorax has the sides more divergent, extending farther from the sides of the abdomen, which is also true of the male in a lesser degree.

The whole basal plate is narrower, while the paramers are wider across their bases and slightly longer, and the endomeral plate is wider. The whole insect averages longer and wider, having the measurements of the various segments equal to or greater than the maximum for the series of *interruptus*. This race is not particularly well marked, but the differences, while slight, are constant. In view of the considerable individual variation in measurements in this group, care must be taken in basing subspecific differences on size *alone*, and then only when there is a sufficient series to determine individual variation.

MEASUREMENTS OF STRONGYLOCOTES COMPLANATUS

Structure	*boucardi*				*interruptus*			
	Male		Female		Males		Females	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	2.93	-------	3.08	-------	2.54–2.76	----------	2.88–3.04	
Head	0.78	0.69	0.81	0.67	0.73–0.78	0.59–0.55	0.76–0.79	0.59–0.65
Prothorax	0.35	0.56	0.39	0.57	0.33–0.40	0.48–0.54	0.35–0.43	0.54–0.54
Mesothorax	0.56	0.84	0.59	0.79	0.50–0.54	0.65–0.79	0.50–0.56	0.72–0.85
Metathoracic apron	0.29	0.56	0.29	0.56	0.26–0.30	0.50–0.54	0.28–0.30	0.54–0.58
Abdomen	1.60	1.37	1.75	1.28	1.35–1.45	1.00–1.18	1.61–1.66	1.18–1.26
Antennae	0.52	0.065	0.46	0.065	0.45–0.50	----------	0.41–0.48	

STRONGYLOCOTES COMPLANATUS FIMBRIATUS Clay

Strongylocotes complanatus fimbriatus CLAY, Proc. Zool. Soc. London, ser. B, 1937, p. 156, pl. 4, fig. 3. (Hosts: *Crypturellus c. cinnamomeus*, Nicaragua; and *C. cinnamomeus mexicanus*, Mexico.)

This race is represented by three adult females and four juvenals. They were taken on *Crypturellus cinnamomeus sallaei*, collected by the author at Tres Zapotes, Veracruz, Mexico, on March 27, 1940.

It is of the type of *S. c. interruptus*, agreeing closely in size with

that race and with *S. c. boucardi*, except that the head and thorax are narrower (in the female). The shape of the head in the female is different from all other known races of *complanatus*. The lines of the head are much less divergent from the front to the eye, the comparative width of the frons being a little greater and the width at the eye much less, while the temples project abruptly from the posterior edge of the eye, then slope rapidly inward to the narrow occiput.

In the other races we have an almost straight line from the sides of the frons back to the widest point of the temples, then an abrupt convergence to the sides of the occiput. The clypeal band, which completely encircles the front of the head beyond the trabeculae, is considerably narrower than in the other races; so also is the median projection from this band, while all the other bands of the head are of the same width as in the other races. The shape and markings of the abdomen are very similar to those of *boucardi*, except the last segment, which is smaller (0.39 by 0.63 against 0.41 by 0.55 mm.), while its chaetotaxy is entirely different. In *boucardi* the posterior margin has a sparse series of about eight strong, longish hairs on each side, with probably 20 shorter, fine hairs intermixed with them. In *intertuptus* the stout hairs number about six and are thicker and a bit shorter, while the fine hairs are shorter and finer. In *fimbriatus* there are about 12 of the long, strong hairs, with a correspondingly greater number of the fine ones, which, however, are much longer and thicker than in the other two races. The posterior margin of the last segment is also more tranverse in outline (less curving on each side), with the extreme lateral portions curving abruptly forward.

MEASUREMENTS OF FEMALE SPECIMEN OF STRONGYLOCOTES COMPLANATUS FIMBRIATUS

Structure	Length	Width
Body	2.93	
Head	0.78	0.61
Prothorax	0.37	0.52
Mesothorax	0.56	0.72
Metathorax	0.30	0.54
Abdomen	1.71	1.24
Antennae	0.43	

STRONGYLOCOTES COMPLANATUS SETIFER Hopkins

Goniodes setosus Piaget, Les Pédiculines, p. 263, pl. 21, fig. 9, 1880. (Host: *Crypturellus* [*Tinamus*] *variegatus*.)

Strongylocotes lipogonus setosus (Piaget) Carriker, Lice of the tinamous, p. 92, 1936.

Strongylocotes setifer Hopkins, Ann. Mag. Nat. Hist., ser. 11, vol. 9, p. 116, 1942. Nom. nov. for *setosus* Piaget, preoccupied.

It is now a well-established fact that the lice described by the author under the genus *Nirmocotes* are nothing more than the juvenals of various species of *Strongylocotes*, and taking this into consideration a further careful study of Piaget's description and figure of *Goniodes setosus* leads me to believe that it is an immature specimen of a race of *Strongylocotes complanatus*, probably the same or very close to *S. complanatus variegatus* Carriker (1936, p. 86) described from *Crypturellus variegatus salvini*. No form of *Strongylocotes* has as yet been recorded by modern authors from Piaget's host of *setosus* (*Crypturellus v. variegatus*), which may very likely prove to be different subspecifically from *S. c. variegatus* Carriker, and so it is possibly better to keep the two forms separate until fresh material can be examined from *C. v. variegatus*. Should these prove to be the same as *S. c. variegatus* Carriker, then that name becomes a synonym of *S. c. setosus* (Piaget).

One of the principal characters that led me to believe that the type of *setosus* was an immature of *complanatus* is the shape of the metathoracic apron, which is typical of all species of *Strongylocotes* having a *median projection on the clypeal band*, while no known species of *Strongylocotes* lacking this projection has the metathoracic apron of the shape shown in Piaget's figure of *setosus*. The absence of the median projection on the clypeal band (in Piaget's figure) has no significance, since this projection is always absent in *all* young of the genus, while the shape of the tip of the abdomen also differs radically in the young. The above arguments, taken in connection with the fact that a race of *complanatus* has been taken on a closely related subspecies of the host of *setosus*, seem to be conclusive evidence.

STRONGYLOCOTES SUBCONICEPS SUBCONICEPS Carriker

Strongylocotes subconiceps Carriker, Lice of the tinamous, p. 90, pl. 8, figs. 1, 1a, 1936. (Host: *Crypturellus soui inconspicuus*, Bolivia.)

A series of 21 adults of both sexes and immature were taken on three individuals of *Crypturellus soui meserythrus* at Tres Zapotes and Cerro Tuxtla, Veracruz, Mexico.

This series is very uniform *inter se* and extremely close to the type series of *subconiceps* in all respects. The peculiar truncate-conical shape of the head, the narrow, scarcely protruding meso-thorax, and the curious apical segments of the abdomen in the male combine to make this species easily recognizable. The taking of this form on the Mexican host *C. s. meserythrus* makes the fifth race of *C. soui* on which I have found it, a very unusual record for any mallophagan parasite of the tinamous, all of which would seem to offer strong proof of the very close relationship between the races

of *soui* and also to lend support to the supposition that they are all of comparatively recent origin.

STRONGYLOCOTES SUBCONICEPS PERIJAE, new subspecies

FIGURE 4, *g*, *h*

Types.—Male and female, adults, from *Crypturellus soui* (*mustelinus*(*?*)), collected by the author of Tierra Nueva, Sierra Perijá, Colombia, July 8, 1941; in the U. S. National Museum.

Diagnosis.—An immature male of *perijae* has the genitalia fully developed but not fully chitinized, nor are the bodily markings clearly outlined. The median projection on the clypeal band is entirely absent, yet the metathoracic apron is adready outlined. This young male is still smaller than the single adult male taken.

The three females are almost identical in size and vary but little in this respect from typical *subconiceps*. In *subconiceps* the females are much *smaller* than the males (a very unusual situation), while in *perijae* the sexes are very closely matched in size, some measurements being greater in the male, others in the female. In *perijae* the frons is wider and more convex; the last segments of the abdomen in the male differ considerably in shape, as well as in chaetotaxy (see figure). There seems to be no difference in the shape of the apical segments in the female, but the ventral fringe of setae are much finer and shorter in *perijae* (see fig.).

MEASUREMENTS OF STRONGYLOCOTES SUBCONICEPS

Structure	*subconiceps*				*perijae*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	3.15		2.82		3.00		2.69	
Head	0.86		0.76		0.74		0.75	
Base of trabeculae		0.26		0.24		0.26		0.25
Temples		0.70		0.76		0.59		0.57
Prothorax	0.46	0.64	0.40	0.47	0.39	0.50	0.38	0.49
Pterothorax	0.60	0.83	0.48	0.60	0.48	0.67	0.50	0.68
Metathoracic apron	0.30	0.54	0.28	0.43	0.25	0.45	0.28	0.46
Abdomen	1.83	1.10	1.50	1.11	1.38	0.92	1.50	1.06
Antennae	0.43	0.073	0.40		0.39	0.053	0.37	0.045
Paramers	0.13	0.075			0.13	0.087		
Endomeral plate	0.087	0.043						

STRONGYLOCOTES SPINOSUS (Piaget)

Goniodes spinosus PIAGET, Les Pédiculines, p. 261, pl. 21, fig. 7, 1880. (Host: *Nothocercus* [*Tinamus*] *julius*.)

Strongylocotes spinosus (Piaget) TASCHENBERG, Die Mallophagen, p. 57, 1882.

Under the discussion of this species published by the author in 1936 ("Lice of the Tinamous," p. 88) it was stated that two females taken

on *Nothocercus nigrocapillus* at Huacapistana, Peru, belonged to it, and a figure was published (pl. 7, fig. 4). At the same time the species *S. subspinosus* Carriker was described from the same host collected at Sandillani, Bolivia. A careful study of this material, in connection with an adequate series of a *Strongylocotes* taken on *Nothocercus bonaparti*, leads me to revise my former treatment of this group.

Unquestionably the two females taken on *N. nigrocapillus*, at Huacapistana, Peru, cannot be called *spinosus* (Piaget), and it is equally certain that they are not *subspinosus* Carriker, although they are conspecific with both. A review of all the material of *Strongylocotes* taken on the different species of *Nothocercus* shows that they are all conspecific with *S. spinosus* (Piaget) but represent various well-marked subspecies.

The specimen of *Nothocercus* shot at Huacapistana (central Peru) is an intermediate between typical *nigrocapillus* of Bolivia and *N. nigrocapillus cadwaladeri* of north Peru, closer, perhaps, to the latter, which would readily account for the differences between the parasites on the central Peru and Bolivian hosts.

The figure of *S. subspinosus* published in "The Lice of the Tinamous" (pl. 8, fig. 2) is misleading in numerous details, especially in the pterothorax, the chaetotaxy of the abdomen, and the abdominal plates, especially in the first segment and the metathoracic apron.

It is now clearly evident that not only the types of *subspinosus* but the entire type series have the posterior angle of the pterothorax either doubled under or crumpled in a manner that completely distorts the shape of that segment. In reality the pterothorax is of the same shape as that of *spinosus* (the principal character on which the specific distinction was based), a fact amply proved by the series from *Nothocercus bonaparti*, some of which also have the angles doubled under while others are of the normal shape. All these forms of *Strongylocotes* from the avian genus *Nothocercus* have the same general shape of head, thorax, and abdomen, especially the terminal segments, in both sexes, all splendid characters for separating the species of this genus, and so it would seem a more rational proceeding to make them all conspecific, and subspecies of *spinosus*.

The following arrangement of the various known forms of the *spinosus* group is therefore proposed:

STRONGYLOCOTES SPINOSUS SPINOSUS (Piaget)

Goniodes spinosus PIAGET, Les Pédiculines, p. 261, pl. 21, fig. 7, 1880. (Host: *Nothocercus* [*Tinamus*] *julius*.)

This race is known at present only from the figure and description of the female as given by Piaget and Taschenberg, which, so far as

they go, are very good but hardly sufficient for the separation of closely related subspecies. Until fresh material from that host can be examined we must take for granted (by analogy) that the parasite from this host is different from those taken on the other species of *Nothocercus*.

STRONGYLOCOTES SPINOSUS SUBSPINOSUS Carriker

FIGURE 5, *a–c*

Strongylocotes spinosus subspinosus CARRIKER, Lice of the tinamous, p. 89, pl. 8, figs 2, 2a, 1936 (also male genitalia without number). (Host: *Nothocercus n. nigrocapillus.*)

The status of this form has been fully discussed above. Since corrected figures are herewith given, no further description is necessary.

STRONGYLOCOTES SPINOSUS PERUVIANUS, new subspecies

Strongylocotes spinosus (Piaget), CARRIKER. Lice of the tinamous, p. 88, pl. 7, fig. 4, 1936. (Host: *Nothocercus nigrocapillus* (near) *cadwaladeri.*)

The original description and figure of the female, as cited above, are ample for the determination of this race. They are of the two females previously identified as *S. spinosus* (Piaget).

STRONGYLOCOTES SPINOSUS BONAPARTI, new subspecies

FIGURE 5, *d*

Types.—Male and female, adults from *Nothocercus bonaparti*, collected by the author at Tierra Nueva, Sierra Perijá, Colombia, July 16, 1941; in U. S. National Museum.

Diagnosis.—This race is close to *subspinosus*, the differences being slight but constant. The male genitalia differ but slightly, the basal plate being somewhat narrower at its distal end, so that the paramers are set more closely together; the paramers are slightly longer, heavier at base but slender apically; there are also slight differences in the structure of the endomeral plate.

In *subspinosus* both sexes have *one* long hair attached on the posterior margin of abdominal segment I, at the inner point of the paratergal plate. The succeeding segments, back to V, have a very short, slender hair at this same place. In *bonaparti* the male has a long, strong hair (longer than width of succeeding segment) in segments I to IV, while on V it is half the length. In the female there is a long hair *only* on segment I, while the hairs on the succeeding segments are so small as to be almost invisible. There are other minor differences in the abdominal chaetotaxy of the female, especially of the spines and fine hairs on the genital plate.

The clypeal band in both sexes is considerably narrower around the *frons*, in front of the break in this band. The anterior angles of

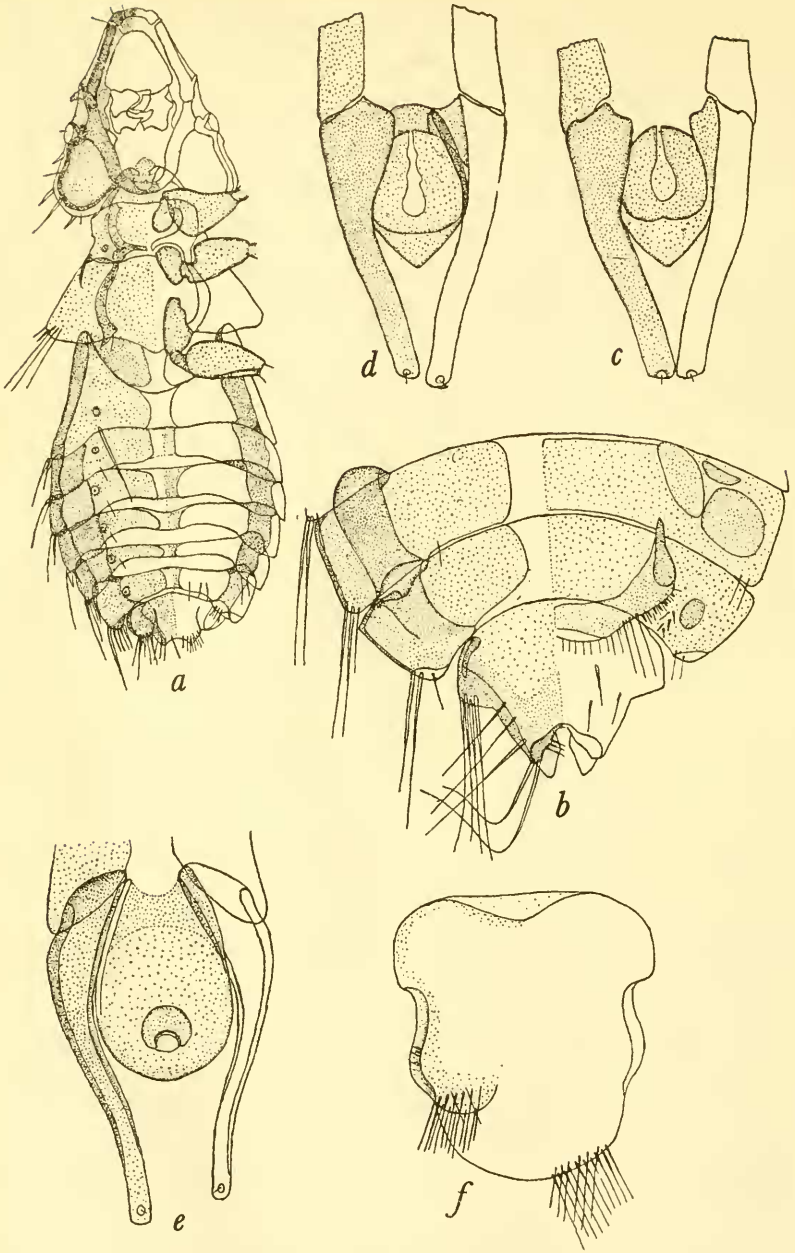

FIGURE 5.—STRONGYLOCOTES

a–c, *Strongylocotes spinosus subspinosus* Carriker: *a*, Body of male; *b*, tip of female abdomen; *c*, male genitalia.

d, *S. s. bonaparti*, new subspecies: Male genitalia.

e, *f*, *S. angulocapitis taoi*, new subspecies: *e*, Male genitalia; *f*, male abdominal segment VII.

the prothorax are more rounded and the lateral notch is absent, while the sides of the pterothorax are much more convex.

MEASUREMENTS OF STRONGYLOCOTES SPINOSUS

Structure	*bonaparti*				*subspinosus*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	2.85		3.17		2.79		2.95	
Head at trabeculae	0.90	0.53	0.94	0.54	0.91	0.52	0.89	0.52
Head at temples		0.83		0.87		0.83		0.78
Prothorax	0.40	0.56	0.43	0.59	0.38	0.54	0.39	0.54
Pterothorax	0.41	0.91	0.47	1.00	0.43	1.00	0.43	1.00
Metathoracic apron	0.24	0.59	0.25	0.61	0.25	0.54	0.24	0.56
Abdomen	1.54	1.06	1.78	1.13	1.47	1.12	1.69	1.06
Antennae	0.456	0.078	0.48	0.075	0.50	0.087	0.456	0.075
Paramers	0.15	0.09			0.135	0.10		
Endomeral plate	0.09	0.05			0.087	0.05		

STRONGYLOCOTES ANGULOCAPITIS Carriker

Strongylocotes angulocapitis CARRIKER, Lice of the tinamous. p. 89, pl. 8, fig. 3, 1936. (Host: *Tinamus s. serratus.*)

This species was described from one juvenal and two adult females, from two different individuals of the same species of host. Two females from *Tinamus t. tao*, collected at La Cumbre de Valencia, Venezula, were identified as being the same.

The two females from Venezuela have unaccountably disappeared, but the following additional material of *S. angulocapitis* was obtained at a later date: One male and two females from the type host, *Tinamus s. serratus*, collected at Río Chaparé, Bolivia; three males and three females from *Tinamus t. tao*, taken at Sierra Perijá, Colombia; one male and one female from *Tinamus tao weddelli*, collected at Palmar, Dept. Cochabamba, Bolivia; and three males and four females from *Tinamus major ruficeps*, from Sierra Perijá, Colombia.

The male of *S. angulocapitis*, hitherto unknown, is herewith described and figured. The shape of the last abdominal segments and the markings of the whole abdomen are so unique that the species (outside of the unusual shape of the head) may be recognized at a glance.

The parasites taken on *T. t. tao* prove to be subspecifically distinct, as well as those from *T. tao weddelli* and the series from *T. major ruficeps.*

In the figure of the male the second segment of the antennae is shown as being considerably thicker than the same segment in the female. I have since discovered that this was caused by the position of the

antennae in the mounted specimen. Apparently this second segment (and to some extent the third) is not cylindrical, but *flattened*, its width differing according to the side shown. The figure of the male shows clearly the chaetotaxy of the abdomen, and so a detailed description of same seems superfluous. We have the following subspecies of *angulocapitis:*

STRONGYLOCOTES ANGULOCAPITIS ANGULOCAPITIS Carriker

FIGURE 6, *a–d*

Of all the races this is the smallest in all dimensions; the paramers are equal to those of *S. a. taoi* (described below) but shorter than the other two races (also described below); the endomeral plate is *longer* than all the other races except *ruficeps;* pterothorax scarcely wider than abdomen in the male; the only race in which the female has the pterothorax *wider* than in the male; hairs on abdomen long and coarse; terminal segment in the male small (see fig.); pterothorax with posterior angle rounded and shorter.

STRONGYLOCOTES ANGULOCAPITIS TAOI, new subspecies

FIGURE 5, *e, f*

Types.—Male and female, adults, from *Tinamus t. tao*, collected at Tierra Nueva, Sierra Perijá, Colombia, by the author on July 8, 1941; in U. S. National Museum.

Diagnosis.—The width of head at the trabeculae is equal to that of *angulocapitis* but is wider at the temples and longer; in the female the head is wider at the trabeculae and narrower at the temples than in *angulocapitis* and in the male of *taoi;* the pterothorax is much wider than the abdomen in the male; the pterothorax of the female is narrower than that of the male; the abdominal hairs are fewer and shorter; the terminal segment in the male is large; the posterior angle of the pterothorax is sharp and longer posteriorly.

STRONGYLOCOTES ANGULOCAPITIS WEDDELLI, new subspecies

FIGURE 6, *e, f*

Types.—Male and female, adults, from *Tinamus tao weddelli*, collected by the author at Palmar, Dept. Cochabamba, Bolivia, July 12, 1927; in collection of the author.

Diagnosis.—The head is the same width at the trabeculae in both sexes but much narrower at the temples in the female; pterothorax wider than in *angulocapitis* and *ruficeps* but narrower than in *taoi:* the pterothorax of the female is narrower than that of the male; hairs

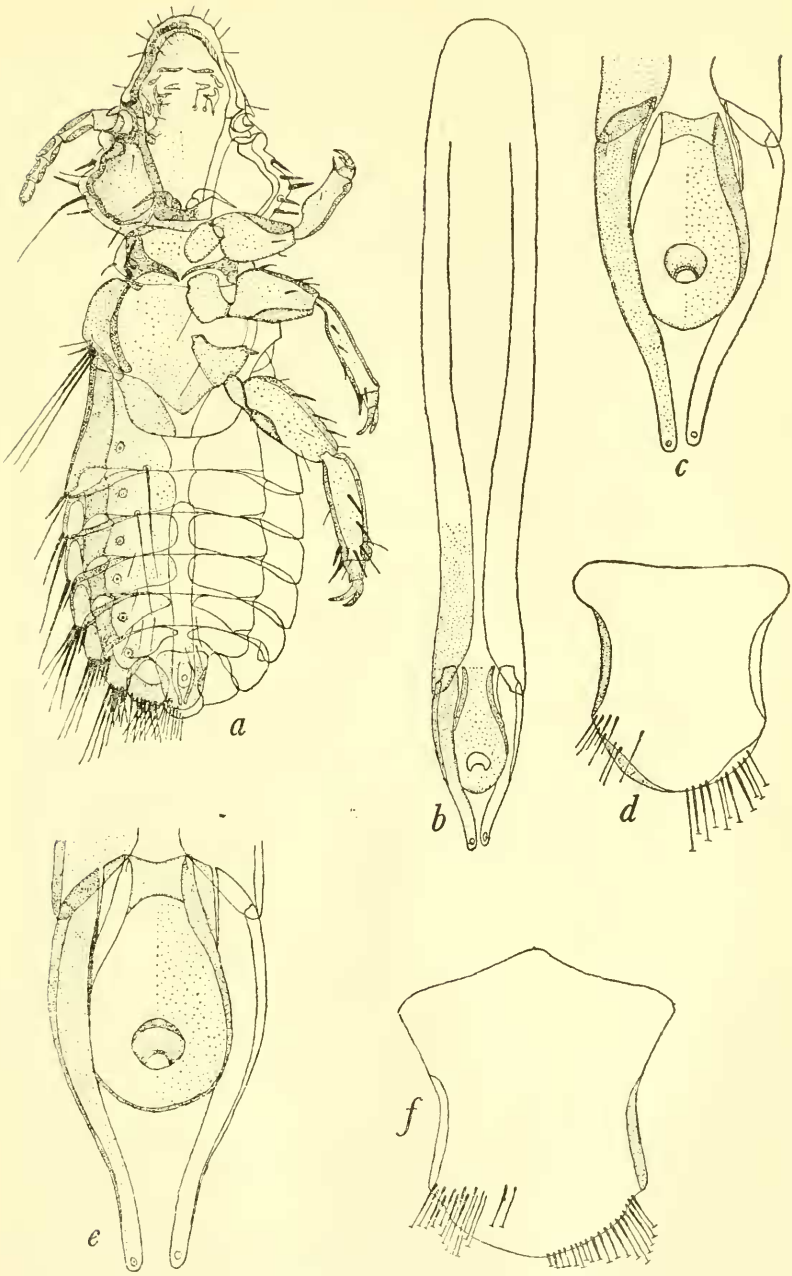

FIGURE 6.—STRONGYLOCOTES

a–d, *Strongylocotes angulocapitis angulocapitis* Carriker: *a*, Body of male; *b*, male genitalia; *c*, male genitalia (enlarged); *d*, male abdominal segment VII.

e, *f*, *S. a. weddelli*, new subspecies: *e*, Male genitalia; *f*, male abdominal segment VII.

on abdomen of medium length and number; the terminal segment in male is large; the posterior angle of the pterothorax *short* and *sharp*.

MEASUREMENTS OF STRONGYLOCOTES ANGULOCAPITIS

Structure	*angulocapitis*				*taoi*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	2.97		3.25		3.21		3.47	
Head trabeculae	0.95	0.54	0.95	0.56	1.03	0.54	1.00	0.58
Head temples		0.90		0.84		0.98		0.92
Prothorax	0.40	0.58	0.41	0.58	0.46	0.65	0.45	0.65
Pterothorax	0.58	0.84	0.63	0.89	0.68	0.99	0.69	0.91
Metathoracic apron	0.29	0.60	0.32	0.63	0.38	0.71	0.37	0.67
Abdomen	1.56	1.04	1.73	1.13	1.60	1.09	1.89	1.30
Antennae	0.57	0.09	0.56	0.087	0.63	0.09	0.61	0.087
Basal plate	0.74	0.09			0.79	0.11		
Paramers	0.16	0.09			0.16	0.118		
Endomeral plate	0.13	0.053			0.097	0.068		

Structure	*weddelli* [1]				*ruficeps*			
Body	3.38		3.44		3.18		3.36	
Head trabeculae	1.07	0.58	1.01	0.58	0.97	0.55	0.95	0.56
Head temples		1.06		0.96		0.96		0.87
Prothorax	0.49	0.67	0.46	0.64	0.46	0.63	0.45	0.63
Pterothorax	0.67	0.97		0.91	0.67	0.94	0.71	0.91
Metathoracic apron	0.35	0.71		0.71	0.30	0.78	0.30	0.69
Abdomen	1.76	1.19	1.91	1.25	1.66	1.11	1.84	1.30
Antennae	0.67	0.097	0.63	0.087	0.64	0.09	0.52	0.085
Basal plate	0.91	0.13			0.87	0.10		
Paramers	0.18	0.11			0.195	0.097		
Endomeral plate	0.11	0.075						

Measurement	Last abdominal segment in males			
	angulocapitis	*taoi*	*weddelli*	*ruficeps*
Length	0.28	0.35	0.326	0.29
Width at anterior end	0.23	0.29	0.29	0.28
Width at posterior end	0.17	0.24	0.217	0.24

[1] The female of *weddelli* is probably slightly immature.

STRONGYLOCOTES ANGULOCAPITIS RUFICEPS, new subspecies

FIGURE 7, *d*, *e*

Types.—Male and female, adults, from *Tinamus major ruficeps*, collected by the author at El Bosque, Sierra Perijá, Colombia, June 14, 1941; in U. S. National Museum.

Diagnosis.—This race is nearest in size to *angulocapitis;* the head at the trabeculae is equal in width in both sexes but much narrower at

the temples in the female; the pterothorax is but little wider than the abdomen in the male, and the same segment is narrower in the female than in the male; the terminal segment is smaller, being the same length as in *angulocapitis*, but considerably wider; the hairs are short and fine at tip of abdomen, longer along the sides and slender; the pterothorax is longer posteriorly, the angle rounded, but less so than in *angulocapitis* (see fig.).

STRONGYLOCOTES PELLUCIDIFRONS, new species

FIGURE 7, *a–c*

Types.—Male and female, adults, from *Tinamus major percautus*, colleted by the author on Cerro Tuxtla, Veracruz, Mexico, March 28, 1940; in U. S. National Museum.

This species presents a combination of the characters of *S. angulocapitis* Carriker and *S. spinosus* (Piaget), having the shape of the head, prothorax, and last abdominal segment in the female similar to the former, with the mesothorax of the latter. The only other known species of the genus that have the last abdominal segment, in both sexes, similar to the present one are *lipogonus*, *wernecki*,[2] and *complanatus* (also the female in *angulocapitis*), while the only ones with a similar-shaped head (and lacking the median spur on the clypeal band) are *spinosus*, *subspinosus*, *wernecki*, and *angulocapitis*. All the species possessing this type of head have the metathoracic apron *circular* on the posterior margin, while all the others have it straight, or nearly so (slightly concave in *lipogonus*). Perhaps the most unique character possessed by this species, and not found in any other of the genus, is the hyaline border around the front of the head, beginning about halfway between the trabeculae and the frons. This hyaline border is slightly wider at the sides, where it measures 0.03 mm. It was from this character that the species received its name.

The genital armature is of the same type as *complanatus* but differs in having the basal plate constricted apically and in having the paramers curving *outwardly* toward their tips, instead of *inwardly*, as in *complanatus*.

A detailed description of the male is unnecessary since all essential characters are clearly delineated in the accompany figures, while the last two abdominal segments of the female are also figured. The heavy, deeply pigmented, longitudinal bands across the pleural plates in the female are similar to those in *angulocapitis*. In addition, the

[2] *Strongylocotes wernecki* Guimarães and Lane, from *Tinamus solitarius*, is very close to *S. pellucidifrons* but lacks entirely the hyaline border around the front of the head. *S. latithorax* Kéler, from *Tinamus solitarius*, is a synonym of *S. wernecki*, the latter having priority over the former by a year.

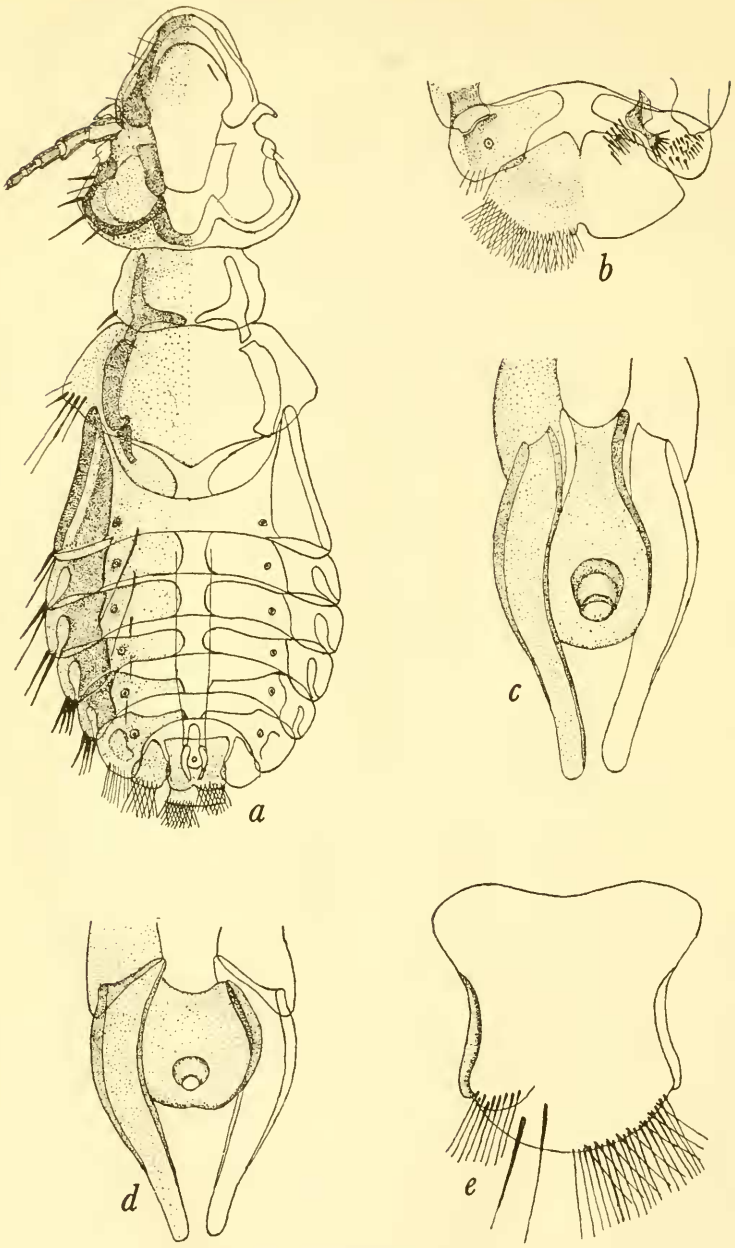

FIGURE 7.—STRONGYLOCOTES

a–c, *Strongylocotes pellucidifrons*, new species: *a*, Body of male; *b*, tip of female abdomen; *c*, male genitalia.

d, *e*, *S. angulocapitis ruficeps*, new subspecies: *d*, Male genitalia; *e*, male abdominal segment VII.

female has the head and all the thoracic segments actually narrower than in the male, although all are slightly longer. The abdomen is both longer and wider in the female.

MEASUREMENTS OF STRONGYLOCOTES PELLUCIDIFRONS

Structure	Male		Female	
	Length	Width	Length	Width
Body	3.21		3.56	
Head	1.00	0.93	1.00	0.89
Prothorax	0.37	0.70	0.39	0.65
Mesothorax	0.63	1.05	0.65	1.02
Metathoracic apron	0.28	0.68	0.32	0.67
Abdomen	1.67.	1.19	1.90	1.39
Antennae	0.58	0.087	0.57	0.087

STRONGYLOCOTES LIPOGONUS LIPOGONUS (Nitzsch)

Goniodes lipogonus NITZSCH, *in* Giebel, Zeitschr. für Ges. Naturw., vol. 28, p. 388, 1866. (Host: *Rhynchotus r. rufescens.*)

A reexamination of the material treated in "The Lice of the Tinamous," 1936, together with additional material from *Rhynchotus rufescens maculicollis*, shows that the parasites from the two host subspecies are not the same. The specimens from *R. r. maculicollis* differ from true *lipogonus* in the size and proportions of the head, the male genitalia (see table of measurements), and in the chaetotaxy of the abdomen. It seems best, therefore, to give the insects from *R. r. maculicollis* subspecific rank (since I consider *R. r. rufescens* to be the host of *S. l. lipogonus*), and they may be called:

STRONGYLOCOTES LIPOGONUS ALTICOLA, new subspecies

Types.—Male and female, adults, from *Rhynchotus rufescens maculicollis*, collected by the author at Sandillani, Dept. La Paz, Bolivia, December 11, 1934; in collection of author.

Diagnosis.—In *S. l. alticola* the head of the male is smaller in all proportions than that of true *lipogonus*, although the frons is wider in proportion to the width at the trabeculae and temples. In the genital armature we have the paramers of *alticola* very much shorter and narrower, as well as the endomeral plate, although the latter is considerably wider in proportion to its length. In the female there are 10 strong hairs on each side of the posterior margin of the last abdominal segment, while in *lipogonus* there are but 7 hairs; in the lateral angles of segments IV and V there are one weak and two strong hairs in *alticola*, and but one strong and one weak hair in *lipogonus*, while on segment VI there are one weak and three strong hairs in *alticola*

and but two strong ones in *lipogonus*. There are other minor characters, but the above are sufficient for the easy recognition of the new race.

MEASUREMENTS OF MALES OF STRONGYLOCOTES LIPOGONUS

Structure	*lipogonus*		*alticola*	
	Length	Width	Length	Width
Head: at frons	0.94	0.30	0.89	0.28
Head: at trabeculae		0.73		0.66
Head: at temples		0.965		0.87
Paramers	0.174	0.087	0.14	0.067
Endomeral plate	0.13	0.053	0.097	0.043

Subfamily PHYSCONELLINAE Carriker

Genus PHYSCONELLA Paine

PHYSCONELLA KELLOGGI KELLOGGI (Paine)

Ancistrocephalus kelloggi PAINE, Psyche, vol. 20, p. 158, fig. 1, 1913.
Physconella kelloggi PAINE, Psyche, vol. 21, p. 23, 1914.
Physconella k. kelloggi (Paine) CARRIKER, Lice of the tinamous, p. 94, 1936. (True host: *Crypturellus soui panamensis.*)

In 1936 I gave no reference to the figure, which is pl. 9, fig. 1, female; while under *P. k. subsimilis* (p. 95) the reference to the figure should read pl. 9, fig. 1a (male genitalia), which is the only figure given for the race.

PHYSCONELLA KELLOGGI SUBSIMILIS Carriker

Physconella kelloggi subsimilis CARRIKER, Lice of the tinamous, p. 95, pl. 9, fig. 1a (male genitalia), 1936. (Host: *Crypturellus soui inconspicuus.*)

A single female on *C. s. mustelinus* at Tierra Nueva, Sierra Perijá, Colombia, is so very close to this form that there are no tenable grounds for its separation. While the two hosts are widely separated geographically, they are nevertheless very closely related, and it is not strange to find that both hosts harbor exactly the same kind of parasite. As corroborative proof of this we have *Strongylocotes s. subconiceps* found on *five races* of *Crypturellus soui.*

A male and a female taken on *Crypturellus soui meserythrus*, Cerro Tuxtla, Mexico, may also be referred to this subspecies. The measurements are exceedingly close, the only appreciable differences being the lengths of the abdomen and pterothorax. The former may vary owing to pressure in mounting, while the latter is difficult to determine, since the end of the mesometathoracic suture is not always clearly visible. The genital armature is also very close as to measurements and shape, as are the abdominal hooks. This form has the

hooks very similar to those of *P. h. hamata* (see Carriker, 1936, pl. 9, fig. 2).[3]

MEASUREMENTS OF PHYSCONELLA KELLOGGI SUBSIMILIS

Structure	From Bolivia				From Mexico			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	0.933		1.00		0.933		1.02	
Head	0.25	0.326	0.25	0.347	0.239	0.328	0.260	0.347
Prothorax	0.108	0.27	0.108	0.281	0.110	0.280	0.118	0.280
Mesothorax / Metathorax	0.174	0.369	0.238	0.358	0.15	0.347	0.174	0.370
Abdomen	0.564	0.694	0.596	0.748	0.574	0.660	0.640	0.738

PHYSCONELLA NOTHOCERCAE Carriker

Physconella nothocercae CARRIKER, Lice of the tinamous, p. 97, pl. 10, figs. 1, 1a, 1936. (Host: *Nothocercus nigrocapillus nigrocapillus.*)

Three females of this species were taken on *Nothocercus bonaparti*, collected by the author at Tierra Nueva, Sierra Perijá, Colombia, on July 16, 1941.

These specimens could not be compared directly with the type of *P. nothocercae* but were compared with two females that were taken on another specimen of *Nothocercus nigrocapillus* collected at Huacapistana, Peru, and that were discussed under the description of the species. The measurements are all very close to those of the type and to the two Huacapistana females, while there are no other apparent differences. The male of this species is still unknown.

MEASUREMENTS OF FEMALES OF PHYSCONELLA NOTHOCERCAE

Structure	Type		Specimen from *Nothocercus nigrocapillus* (Peru)		Specimen from *N. bonaparti* (Colombia)	
	Length	Width	Length	Width	Length	Width
Body	1.12		1.16		1.07	
Head: frons	0.28	0.38	0.28	0.305	0.28	0.30
Head: temples				0.38		0.37
Prothorax	0.13	0.27	0.14	0.29	0.13	0.28
Pterothorax	0.22	0.336	0.18	0.37	0.17	0.37
Abdomen	0.68	0.68	0.705	0.76	0.66	0.74
Antennae	0.25		0.27	0.043	0.26	0.043
Frontal hooks			0.087		0.09	
Seventh abdominal segment				0.337		0.347

[3] In the explanation of the plates in "The Lice of the Tinamous," pl. 9, fig. 1, is given as the female of *P. kelloggi subsimilis*, which is an error, this figure illustrating the female of *P. k. kelloggi*, taken on *Crypturellus soui nigriceps* (as given in the text). Figure 1a on the same plate represents the male genitalia of *P. k. subsimilis*, while figs. 2 and 2a are correctly given as of *P. h. hamata*.

Genus MEGAGINUS Carriker

MEGAGINUS EMARGINATUS EMARGINATUS Carriker

Megaginus emarginatus emarginatus CARRIKER, Lice of the tinamous, p. 98, pl. 10, figs. 3–3c, 1936. (Host: *Crypturellus obsoletus punensis*.)

A male and a female taken on *Crypturellus t. tataupa,* Río Lipeo, Bolivia, are extremely close to this species. They are slightly smaller in some dimensions but not in all, while the male genitalia are precisely the same in shape and measurements of their component parts. Most of the discrepancies in measurements might easily fall within the range of individual variation. It is rather unusual to find the same parasite on two hosts so different from each other.

Two males and a female were taken by the author at Samaipata, Bolivia, on *Crypturellus obsoletus crucis*, a recently described race. These three specimens of *Megaginus* are almost identical with others from the type host (*C. o. punensis*), only slight differences, all within the range of individual variation, being present.

MEASUREMENTS OF MEGAGINUS EMARGINATUS EMARGINATUS

Structure	Types (corrected)				Specimens from Río Lipeo, Bolivia			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.19	------	1.25	------	1.085	------	1.19	------
Head	0.43	0.585	0.44	0.585	0.40	0.586	0.40	0.608
Prothorax	0.102	0.30	0.108	0.308	0.108	0.30	0.12	0.31
Pterothorax	0.216	0.40	0.227	0.42	0.19	0.40	0.217	0.42
Abdomen	0.617	0.617	0.68	0.617	0.56	0.59	0.64	0.61
Antennae	0.206	------	0.195	------	0.195	0.043	0.195	0.04
Basal plate	0.25	0.07	------	------	0.28	0.08	------	------
Paramers	0.12	0.065	------	------	0.12	0.065	------	------

MEGAGINUS EMARGINATUS LATACLYPEUS, new subspecies

FIGURE 8, *a*

Type.—Female, adult, from *Crypturellus soui meserythrus*, collected by the author at Tres Zapotes, Veracruz, Mexico, on February 26, 1940; in U. S. National Museum.

When compared with females of *M. e. emarginatus* we find that this new race is considerably smaller in all dimensions except the length of the prothorax, which is actually longer but not quite so wide. All the remaining measurements are consistently smaller except the front of the head. The head is of different shape and porportions, the front being wider, with the frontal emargination shallower and the sides of the front more rounded and expanded; the emarginations on each side of the occiput are less deep; the

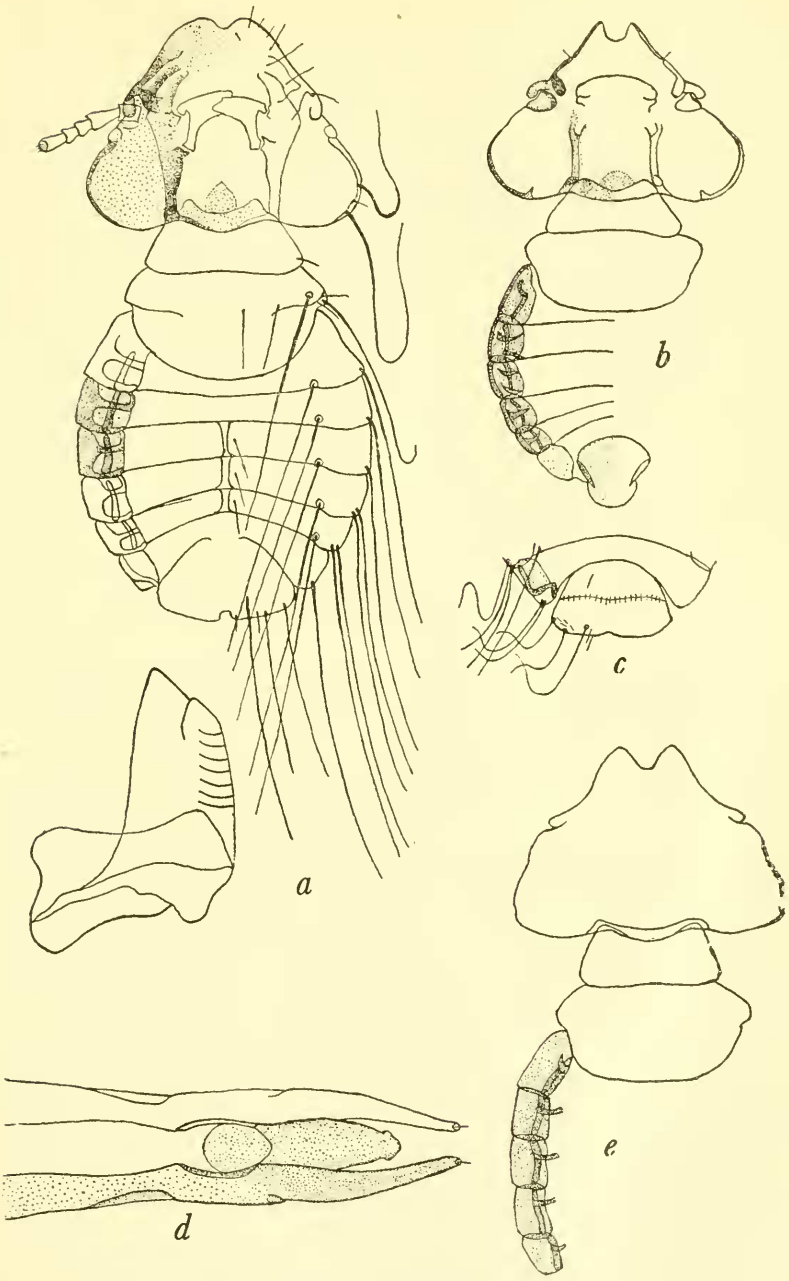

FIGURE 8.—MEGAGINUS

a, *Megaginus emarginatus lataclypeus*, new subspecies: Female with enlarged mandibile.
b–d, *M. e. excavatus*, new subspecies: *b*, Body of male; *c*, tip of female abdomen: *d*. male genitalia.
e, *M. e. dissimilis*, new subspecies: Body of female.

prothorax is wider anteriorly, and the pterothorax extends farther laterally from the sides of the abdomen; the last abdominal segment is more rounded posteriorly and less protuberant.

The chaetotaxy and the markings of the abdominal pleurites seem to be about the same. It is unfortunate that no male is available, since the genitalia would undoubtedly present distinguishing characters. Three additional females were taken on the same bird.

MEASUREMENTS OF MEGAGINUS EMARGINATUS

Structure	*lataclypeus* (female, type)		*emarginatus* (female)	
	Length	Width	Length	Width
Body	1.08		1.26	
Head	0.39	0.51	0.444	0.585
Prothorax	0.118	0.28	0.108	0.309
Pterothorax	0.202	0.38	0.222	0.423
Abdomen	0.57	0.54	0.68	0.618

MEGAGINUS EMARGINATUS EXCAVATUS, new subspecies

FIGURE 8, *b–d*

Types.—Male and female, adults, from *Crypturellus soui inconspicuus*, collected by the author at Santa Ana, Río Coroico, Bolivia, July 30, 1934; in collection of author.

The series of 4 males and 12 females, from which these types were selected, was tentatively placed under *M. e. emarginatus* (Carriker, 1936, p. 100), but a more careful study of them reveals differences much too great to be disregarded.

Diagnosis.—More closely related to *emarginatus* than to *quadrithorax*, having the shape of the prothorax and the pattern of markings on pleural plates similar to the former but differing radically from both in the shape of the head and the frontal emargination.

The head is wider and shorter, with clypeus narrower; the frontal emargination wider and twice the depth, while the bipartite tips of the frons are more pointed. It resembles *M. e. sordidus* in shape of head, although the new form has the head even wider, but it differs from *sordidus* in the narrower clypeus, with tips of frons more pointed, and in deeper and wider emargination, as well as in the markings of the pleural plates.

It differs from *M. e. lataclypeus* in the same way as from the other races of *emarginatus*, viz: in the much narrower clypeus, pointed frons, and deep frontal emargination; in fact, there is no other form of the genus possessing this type of clypeus and clypeal emargination (table of measurements follows *dissimilis*).

MEGAGINUS EMARGINATUS DISSIMILIS, new subspecies

FIGURE 8, *e*

Type.—Female, adult, from *Crypturellus soui nigriceps*, collected by the author at Tamborapa, northern Peru, July 14, 1933; in collection of author.

Diagnosis.—The type and one female paratype have some of the characters of *excavatus* but differ strikingly in others. The markings on the pleural plates are quite different, there being no band along the lateral margin of these sclerites, while the longitudinal band is nearer to the inner margin of the plates, and the median transverse band begins at the *outer edge of longitudinal* band and extends some distance *inside* of the sclerite, into the tergal plate. The first and the sixth paratergal plates are without markings except for a very faint longitudinal bar along inner edge of sclerite on first segment.

The clypeal emargination is even larger than in *excavatus* and of different shape, being less rounded on the posterior portion, while the preantennal area of the head has the lateral margins decidedly *concave*, and the whole head is differently shaped.

Unfortunately no males are available for study, but the above characters seem to be sufficient to warrant the separation of this form from all the other races.

The measurements of *dissimilis* are almost exactly the same as in the female of *excavatus*, except that the abdomen is wider (0.63 against 0.58 mm.), while the clypeal emargination is 0.06 by 0.087 against 0.043 by 0.065. In both *emarginatus* and *lataclypeus* the emargination is 0.021 by 0.053 mm.

MEASUREMENTS OF MEGAGINUS EMARGINATUS

Structure	*excavatus*				*dissimilis* (female)	
	Male		Female		Length	Width
	Length	Width	Length	Width		
Body	1.05	----------	1.19	----------	1.23	
Head	0.375	0.55	0.39	0.59	0.40	0.586
Prothorax	0.11	0.29	0.13	0.30	0.12	0.305
Pterothorax	0.195	0.38	0.23	0.41	0.23	0.42
Abdomen	0.54	0.54	0.68	0.58	0.67	0.63
Antennae	0.18	0.03	----------	----------	----------	
Basal plate	0.195	0.055	----------	----------	----------	
Paramers	0.097	0.053	----------	----------	----------	
Clypeal emargination	0.043	0.065	----------	----------	0.06	0.087

Genus CUCLOTOCEPHALUS Carriker

Cuclotocephalus CARRIKER, Lice on the tinamous, p. 101, 1936. (Genotype: C. *extraneus* Carriker.)

This genus was erected solely on the characters of the female, the

male being unknown. Since that time I have taken the male, not only on the host of the genotype but also on other species of *Nothoprocta*, but as yet it has not been taken on any other genus.

The additional generic characters that it is necessary to add to the original description are as follows: Antennae dimorphic, the first segment being lengthened and swollen, the second longer than in the female, while the third has a slight hook on the inner side at the distal end; male genitalia simple, resembling very much those of *Megaginus* (see fig.); the female is considerably larger than the male.

The new material of this genus presents a most interesting fact concerning the distribution of the two species originally described as belonging to it, viz: *C. extraneus* and *C. secundus*. At the time of describing them I was uncertain as to whether the two forms were conspecific, but the new material proves conclusively that the two are *distinct species*, since I have taken *both species* on the *same individual host*. Very few cases among the tinamous are now known where two closely related species of the same genus of parasite are found together. One instance is found where two species of *Rhyncothura* have been taken on the same host, and another is the remarkable distribution of *Heptapsogaster mandibularis*, *H. temporalis*, and *H. inexpectata*.

CUCLOTOCEPHALUS EXTRANEUS Carriker

Cuclotocephalus extraneus CARRIKER, Lice of the tinamous, p. 101, pl. 6, figs. 1, 1a, 1936.[4] (Host: *Nothoprocta braniekii*.)

No more specimens of this species have been taken on the type host since 1936, but I now have a large series of both sexes from *Nothoprocta p. pentlandi*, taken at Choros, Bolivia, and one male from same host taken at Oploca, Bolivia, which bird host is the *type host* for *C. secundus;* also another female from *Nothoprocta ornata* subsp., Incachaca, Bolivia.

The above series presents clear-cut characters for the easy separation of *extraneus* and *secundus*, which are as follows: *C. extraneus* may be distinguished by its large size, much wider head, and the type of paratergal plates, which are well outlined on the inner side (in *secundus* they are completely fused with the tergites and the line of suture invisible), much more deeply chitinized, and with a darker-colored band along the outer margin, which is twice as wide as in *secundus*.

The specimens of this species taken on *N. p. pentlandi* prove to be subspecifically distinct from typical *extraneus* and are described below.

[4] The published figure of *extraneus* does not give a true conception of the markings of the paratergal plates.

CUCLOTOCEPHALUS EXTRANEUS SIMILIS, new subspecies

FIGURE 9, *a*, *c*

Types.—Male and female, adults, from *Nothoprocta p. pentlandi*, collected by the author at Choros, Dept. Cochabamba, Bolivia, on January 10, 1937; in collection of the author.

There is very little difference in size between *extraneus* and *similis*, the former being slightly larger in all dimensions, with the abdomen much wider (0.80 against 0.64 mm.); the markings of the paratergal plates are decidedly different (see fig.). In *extraneus* they are wider and have the greater part deeply colored, with this more heavily chitinized portion *concave on the inner side*, with the top and bottom portions reaching to the inner side of the sclerite. In *similis* the paratergal plates are narrower, and have the deeply colored portion reduced to a narrow band along the outer margin of the sclerite. A character not mentioned in the original description of *extraneus*, and present also in *similis*, is the tessellated dorsal surface of the pterothorax and abdomen more noticeable on the paratergal plates. The chaetotaxy of the abdomen is essentially the same in the two races, except that the prominent dorsal hairs are *shorter* and *slenderer*.

MEASUREMENTS OF CUCLOTOCEPHALUS EXTRANEUS

Structure	*extraneus* (type, female)		*similis*			
			Male		Female	
	Length	Width	Length	Width	Length	Width
Body	1.97	----	1.53	----	1.90	
Head	0.52	0.53	0.44	0.43	0.50	0.49
Prothorax	0.19	0.325	0.174	0.26	0.17	0.29
Pterothorax	0.34	0.42	0.29	0.347	0.326	0.395
Abdomen	1.22	0.80	0.88	0.58	1.19	0.64
Antennae	0.227	----	0.24	0.045	0.217	0.04
Basal plate	0.195	0.075	----	----	----	
Paramers	0.195	0.097	----	----	----	
Endomeral plate	0.105	0.06	----	----	----	

The male genitalia are quite simple, consisting of a short basal plate, scarcely, if any, longer than the paramers, not so wide, and poorly chitinized; the paramers are thicker at their bases, tapering slightly to their tips, which are bent inward. The dorsal endomeral plate overlaps the inner edge of the paramers for most of its length, is slightly more than half the length of the paramers, and has the posterior end bluntly pointed; the ventral endomeres are reduced to a pair of short, narrow bars on each side of the dorsal endomere; penis absent.

Eight males and five females (including the types) were taken on the type host at Oploca, Bolivia, and a single female on *Nothoprocta* from Incachaca. This female is not quite typical, but until more material is available for study it seems best to place it here.

CUCLOTOCEPHALUS EXTRANEUS ORNATUS, new subspecies

FIGURE 9, *b*, *i*

Types.—Male and female, adults, from *Nothoprocta o. ornata*, collected by the author at Callipampa, Bolivia, on June 4, 1936; in collection of author.

Diagnosis.—The head has the front elliptical, instead of uniformly rounded; occiput more deeply emarginate; sides of prothorax more convex and not divergent; pterothorax wider at lateral angles (extending farther beyond sides of abdomen) and its sides more convex.

Whole abdomen much slenderer, the last abdominal segment in the female is of the same shape as in typical *extraneus*, except the anterior end is less conical; the chaetotaxy of the entire body seems to be practically the same as in *extraneus*. The paratergal plates are the same as in *similis*. Region of temples, thorax, paratergal plates and narrow area inside them have the dorsal integument rugose, as in *similis*. There is less dimorphism in the antennae than in *similis;* the basal plate is wider, paramers longer and much narrower. There are some striking discrepancies in the measurements, the abdomen of the female of *ornatus* being narrower than that of the male, while in *similis* it is the reverse; the prothorax and pterothorax of the two sexes are practically the same size in *ornatus*, but in *similis* they differ decidedly; the head is decidedly wider than long in *ornatus*, while in *similis* it is the reverse. The female as compared with *extraneus* is smaller in all dimensions, with the head proportionally wider and the abdomen very much narrower.

MEASUREMENTS OF CUCLOTOCEPHALUS EXTRANEUS ORNATUS

Structure	Male		Female	
	Length	Width	Length	Width
Body	1.58	----------	1.71	
Head	0.43	0.456	0.477	0.50
Prothorax	0.15	0.26	0.15	0.26
Pterothorax	0.28	0.35	0.27	0.35
Abdomen	0.96	0.52	1.07	0.46
Antennae	0.25	0.05	0.217	0.04
Basal plate	0.20	0.087	----------	
Paramers	0.205	0.095	----------	
Endomeral plate	0.11	0.043	----------	

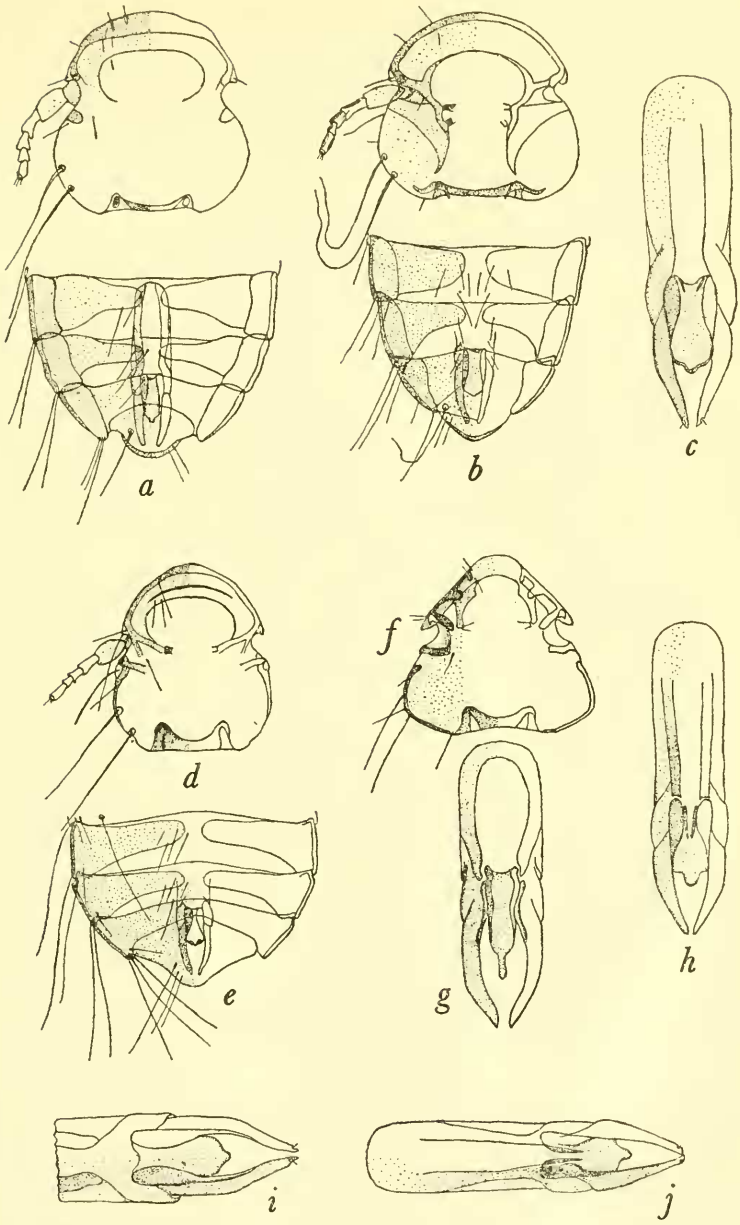

FIGURE 9.—CUCLOTOCEPHALUS AND NOTHOCOTUS

a, *c*, *Cuclotocephalus extraneus similis*, new subspecies: *a*, Male head and tip of abdomen; *c*, male genitalia.

b, *i*, *C. e. ornatus*, new subspecies: *b*, Male head and tip of abdomen; *i*, male genitalia.

d, *e*, *j*, *C. secundus secundus* Carriker: *d*, Male head; *e*, tip of male abdomen; *j*, male genitalia.

f, *g*, *Nothocotus parvithorax parvithorax* Carriker: *f*, Male head; *g*, male genitalia.

h, *Cuclotocephalus secundus incachacae*, new subspecies: Male genitalia.

The single female of *extraneus* taken on *Nothoprocta ornata* subsp., Incachaca, is very close in all respects to *similis*, the size and proportions being almost identical, with nothing outside the range of individual variation. The head is, however, exactly as wide as long, while in *similis* it is slightly longer than wide (0.50 by 0.49 mm.). This specimen I have placed under *C. e. similis*.

CUCLOTOCEPHALUS SECUNDUS SECUNDUS Carriker

FIGURES 9, *d*, *e*, *j*

Cuclotocephalus secundus CARRIKER, Lice of the tinamous, p. 102, pl. 11, fig. 2, 1936. (Host: *Nothoprocta p. pentlandi*.)

The differences between this species and *extraneus* have been fully explained under *extraneus*. The species was described from a single female. I now have additional material of this species as follows: Six males and four females from *Nothoprocta p. pentlandi* (the type host) taken at Oploca and Padilla, Bolivia; three males and two females from *Nothoprocta ornata* subsp., taken at Incachaca, Bolivia.

The four females from Oploca and Padilla seem to be identical with the type, while the specimens from Incachaca are slightly different, presenting discrepancies in size and proportion of abdomen and pterothorax, as well as in all three parts of the male genitalia.

The male, hitherto unknown, may be diagnosed as follows: Very similar to the female except for size, dimorphism in the antennae, and different shape of seventh abdominal segment. The antennae are exactly like those of the male in *extraneus* (see description under genus). Abdominal segment VI is as wide as in the female, but VII is very small and rounded posteriorly; the general shape of the abdomen is very similar in the sexes, except that in the male it is much smaller, but of similar proportions (see table of measurements).

CUCLOTOCEPHALUS SECUNDUS INCACHACAE, new subspecies

FIGURE 9, *h*

Types.—Male and female, adults, from *Nothoprocta ornata* subsp., collected by the author at Incachaca, Dept. Cochabamba, Bolivia, in June 1930; in collection of author.

Diagnosis.—The abdomen of the male is longer and narrower than in *secundus* (0.98 by 0.63 against 0.93 by 0.67 mm.); the pterothorax in the female is wider (0.39 against 0.336 mm.); the basal plate in the male is shorter and wider (0.195 by 0.075 against 0.12 by .0084 mm.); paramers are shorter and narrower (0.108 by 0.075 against 0.12 by 0.084 mm.); endomeral plate longer but of same width (0.097

against 0.087 by 0.043 mm.). The slight differences in the body measurements of the males are unimportant.

MEASUREMENTS OF CUCLOTOCEPHALUS SECUNDUS

Structure	*secundus*				*incachacae*			
	Male (eotype)		Female (type)		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.40	.....	1.69	.....	1.45	.....	1.69	
Head	0.41	0.37	0.455	0.42	0.42	0.38	0.456	0.42
Prothorax	0.15	0.24	0.15	0.26	0.13	0.26	0.155	0.28
Pterothorax	0.26	0.303	0.27	0.336	0.25	0.33	0.29	0.39
Abdomen	0.81	0.56	0.93	0.67	0.82	0.54	0.98	0.63
Antennae	0.205	0.045	0.195	.....	0.20	0.05	0.17	0.033
Basal plate	0.22	0.065	.....	.....	0.195	0.075	.....	
Paramers	0.12	0.084	.....	.....	0.108	0.075	.....	
Endomeral plate	0.087	0.043	.....	.....	0.097	0.043	.....	

Genus NOTHOCOTUS Carriker

NOTHOCOTUS PARVITHORAX PARVITHORAX Carriker

FIGURE 9, *f*, *g*

Nothocotus parvithorax CARRIKER, Lice of the tinamous, p. 104, pl. 11, figs. 3–3b, 1936. (Host: *Nothocercus bonaparti*.)

This species was described from one male and two females. The types are not available for comparison with the series of specimens taken on the type host, collected in the Sierra Perijá, Colombia, in 1941, but a female paratype is still in my collection.

This series is exceedingly uniform *inter se* and does not agree in all respects with the figures of the types of *parvithorax*, nor does the female paratype agree with the published figure. The temples are *not* angulated in either sex, but rounded, almost exactly the shape of the temples in *N. p. subsimilis*. The other difference is in the shape of the paramers, which have the tips bent inward somewhat as in *subsimilis*, but the bent portion is not concave, nor are the tips tapering as in *subsimilis*. An error was probably made in preparing the published drawings of the types, since all the other details of the genital armature in the Colombian insects are as figured for the species.

New figures are herewith given of the head and genital armature of the Colombian insect. Their measurements are very close to those of the types, and until the types can be compared with the Colombian series it seems best to identify them as *N. p. parvithorax*. In view of the more extensive knowledge acquired of this group of Mallophaga, it seems best to make *N. subsimilis* a subspecies of *parvithorax*.

Outside of the dimorphism in the antennae of *parvithorax*, the heads of the two sexes are almost identical, the only difference being slightly greater width at the temples in the female (0.466 against 0.434 mm.); the markings and chaetotaxy are identical, as well as the shape of the temples (see figure of male head).

Subfamily HEPTAPSOGASTRINAE Carriker

Genus RHOPALOCERAS Taschenberg

RHOPALOCERAS ONISCUS (Nitzsch)

Goniodes oniscus NITZSCH, *in* Giebel, Zeitschr. für Ges. Naturw., vol. 28, p. 388 (female), 1866. (Host: *Tinamus tao.*)

Goniodes aliceps NITZSCH, *in* Giebel, ibid., p. 389 (male). (Host: *Crypturus macrourus.*[5])

A fine series of this species was taken on the type host at Tierra Nueva, Sierra Perijá, Colombia, on July 19, 1941. They agree in all respects with the specimen taken on *Tinamus t. tao* in Venezuela, from which the species was redescribed (Carriker, 1936, p. 107).

RHOPALOCERAS GENITALIS GENITALIS Carriker

Rhopaloceras genitalis genitalis CARRIKER, Lice of the tinamous, p. 110, pl. 15, figs. 2–2c, 1936 (Host: *Tinamus serratus ruficeps.*)

Additional specimens of this species were taken on the type host, col-

[5] Kéler (1938, p. 325) suggests that the name *Crypturus macrourus* was a mistake for *Dendrortyx macrourus* and that the specimens were stragglers. Dr. Hopkins was inclined to accept this theory, but I was rather doubtful, even if the two birds had been together in a zoological garden, while in their wild state it would have been utterly impossible, since the birds are not found in the same region at all. However, according to Dr. Hopkins (1940, p. 419) Kéler compared a paratype of *Rhopaloceras genitalis simplex* Carriker (sent to Hopkins by the author) with the type of *Goniodes aliceps* Nitzsch and found them "absolutely identical with Nitzsch's type." This seemed to leave little doubt that the true host of *R. aliceps* (Nitzsch) was *Tinamus major castaneiceps* of Costa Rica, or else some closely related subspecies of *T. major,* and that *R. genitalis simplex* Carriker was a pure synonym of *R. aliceps* (Nitzsch).

Recently I received the following comment from Dr. Hopkins, bearing on the identity and status of *Goniodes aliceps* Nitzsch:

"In the previous note on this species (Hopkins, 1940, pp. 418–421) I discussed the identity of *R. genitalis simplex* Carriker and placed the form in the synonymy of *R. aliceps* (Nitzsch). My reason for this step was that Dr. Kéler, after comparing my male paratype of *simplex* with the male type of *aliceps,* informed me that they were 'absolutely identical,' except for differences in the shape of the temporal lobes which are apparently due to the accidents of mounting.

"L. R. Guimarães has now kindly sent me a copy of Kéler's most recent remarks on *Rhopaloceras* (Kéler, 1939, p. 233), contained in a paper which I had not seen because of war conditions. These remarks compel me to alter my opinion entirely.

"Kéler now synonymizes *Rhopaloceras aliceps* (Nitzsch) with *R. oniscus* (Nitzsch) and states that the penis of the solitary male in the Nitzsch collection (i. e., the type of *aliceps*) is damaged to such a degree as to render impossible a proper comparison with specimens which Carriker described as *oniscus.* He now states that *oniscus* and *genitalis* are specifically distinct.

"In view of the fact that the genitalia of the type of *aliceps* are in such a damaged condition, I am forced to withdraw my statement that *R. g. simplex* is a synonym."

Thus it appears, after much controversy, that the status of *R. oniscus, R. aliceps, R. g. genitalis,* and *R. g. simplex* now definitely remains the same as placed by me in my first treatment of the group (Carriker, 1936).

lected by the author in the Sierra Perijá of Colombia, which agree in every way with the type material.

Five females taken on *Tinamus s. serratus*, collected by the author at Todos Santos, Río Chaparé, Bolivia, agree so closely with the female type of *genitalis* that they must be classed with that species.

RHOPALOCERAS BREVITEMPORALIS Carriker

Rhopaloceras brevitemporalis CARRIKER, Lice of the tinamous, p. 112, pl. 13, figs. 1–1e, 1936. (Host: *Crypturellus obsoletus punensis.*)

An additional series of this species was taken on *Crypturellus obsoletus crucis* by the author at Samaipata, Bolivia, November 2, 1937. These specimens apparently agree in all particulars with the type series from *C. o. punensis.* It would seem, from a study of the mallophagan parasites taken on *C. o. crucis*, that this new race of tinamou is a rather poor one, especially since it was based on a single specimen, probably nothing more than a very old, richly colored male bird.

RHOPALOCERAS RUDIMENTARIUS Carriker

Rhopaloceras rudimentarius CARRIKER, Lice of the tinamous, p. 113, pl. 14, figs. 1–1c, 1936. (Host: *Crypturellus soui nigriceps.*)

A series of 11 males and females from three individuals of *Crypturellus soui meserythrus* collected by the author at Tres Zapotes and Cerro Tuxtla, Veracruz, Mexico, between February and May 1940, agree with the type series of *rudimentarius* in every particular. The male and female genitalia and the number of teeth in the combs of the various abdominal segments are identical.

Three males and three females were also taken on *Crypturellus soui* (*mustelinus* ?), collected by the author at Airoca, Sierra Perijá, Colombia, April 7, 1942, which cannot be separated from the typical specimens. This makes the seventh race of *Crypturellus soui* on which this species of *Rhopaloceras* has been taken by the author, in addition to two races of *C. undulatus.*

The Mexican series is, perhaps, more nearly identical with the types than some of the others, but they all run exceedingly close. In such a widespread genus as *Rhopaloceras*, containing so many species, it is very significant that the various races of *Crypturellus soui* are exceeding close in their relationships. This same fact was noted under *Strongylocotes subconiceps.*

RHOPALOCERAS PENNATICEPS (Paine and Mann)

Goniodes pennaticeps PAINE and MANN, Psyche, vol. 20, p. 16, fig. 3, 1913. (Host: *Anthus lutescens=Crypturellus t. tataupa.*)

Rhopaloceras pennaticeps (Paine and Mann) CARRIKER, Lice of the tinamous, p. 114, 1936. (Host: *Crypturellus t. tataupa.*)

An additional pair was taken on the type host, collected by the author at Río Lipeo, southern Bolivia, and another pair on the same

host at Samaipata, Bolivia, November 4, 1937. They agree exactly with the original insects from which the species was redescribed by the author.

RHOPALOCERAS HETEROGENITALIS HETEROGENITALIS, new species

FIGURE 10, *a*, *b*, *e*

Types.—Male and female, adults, from *Crypturellus b. boucardi*, collected by the author on Cerro Tuxtla, Veracruz, Mexico, on March 28, 1940; in U. S. National Museum.

This species differs from all the other known forms of the genus in the type of the male genital armature. There is no other that it seems to resemble as to the paramers, although the endomeres are somewhat after the type of *brevitemporalis*, to which it is nearest in size and the female genitalia, but it is still considerably larger than that species. The shape of the head is quite close to that of *R. laticeps abbreviatus*, but the thorax and genitalia are very different.

The number of teeth in the abdominal combs varies greatly, both among individuals and between the right and left sides. The accompanying figure shows clearly the shape and structure of the head and thorax and the antennae of both sexes, as well as the last abdominal segment and genital apparatus of the female, while an enlarged figure of the unique male genital armature is given.

MEASUREMENTS OF RHOPALOCERAS HETEROGENITALIS HETEROGENITALIS

Structure	Male		Female	
	Length	Width	Length	Width
Body	2.71		3.51	
Head	0.93	1.43	0.98	1.52
Prothorax	0.32	0.87	0.32	0.90
Mesothorax	0.28	1.01	0.31	1.06
Metathorax	0.19	1.15	0.17	1.16
Abdomen	1.41	1.21	1.95	1.26
Antennae	0.52	0.095	0.45	0.075
Paramers	0.097	0.04		
Endomeres	0.205	0.03		

NUMBER OF TEETH IN ABDOMINAL COMBS

Male		Female	
Left	Right	Left	Right
12	15	17	16
12	12	14	13
10	12	13	12
10	8	11	11
5	3	5	7

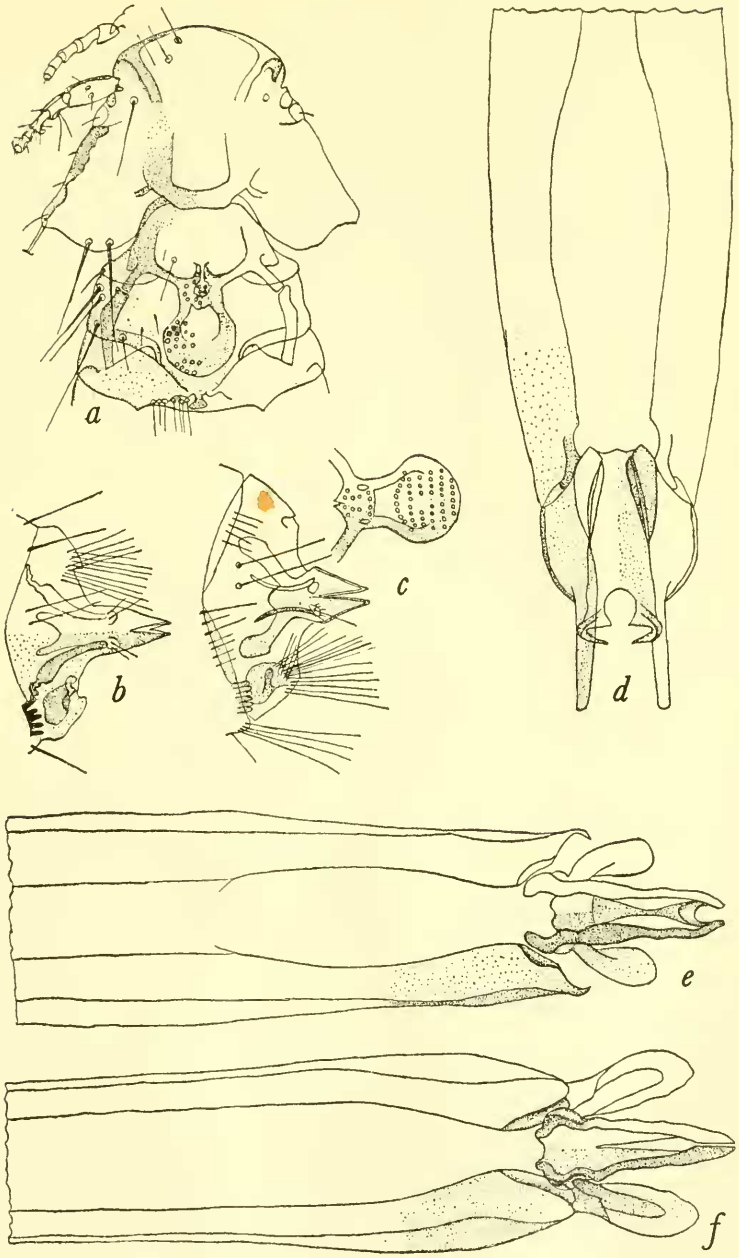

FIGURE 10.—RHOPALOCERAS

a, *b*, *e*, *Rhopaloceras heterogenitalis heterogenitalis*, new species: *a*, Male head and thorax; *b*, tip of female abdomen; *e*, male genitalia.

c, *f*, *R. h. spatulata*, new subspecies: *c*, Tip of female abdomen and mesosternal plate; *f*, male genitalia.

d, *R. laticeps bonaparti*, new subspecies: Male genitalia.

The elongated-oval, thin flaps at each side are unquestionably the paramers and are almost unpigmented except toward the thickened basal portion. The endomeral plates are clearly connected basally, and *apparently* near the tips, and may be covered by a membrane both above and below, thus forming a kind of tube, although there is not a great deal of visible evidence to corroborate this theory. The irregular outline of the endomeres is also a most unusual character. There is nothing unusual about the abdominal structure, other than the apical segment in the female, which is figured. The chaetotaxy is very similiar to that of *brevitemporalis,* as is also the shape of the last abdominal segment in the male. The number of teeth given for the abdominal combs was taken from the types and does not represent the average.

RHOPALOCERAS HETEROGENITALIS SPATULATA, new subspecies

FIGURE 10, *c, f*

Types.—Male and female, adults, from *Crypturellus idoneus*, collected by the author at El Bosque, Sierra Perijá, Colombia, June 14, 1941; in U. S. National Museum.

Diagnosis.—Very closely related in all respects to *R. h. heterogenitalis*, from the Mexican host *Crypturellus b. boucardi.* The head, with the exception of the male antennae, is practically the same shape as in *heterogenitalis*, but a trifle *smaller* in the male and *larger* in the female; the antenna is longer in the male and shorter in the female, and with fewer hairs in the male; the prothorax is the same size in the male, the mesothorax longer, but the same width, while the metathorax is both shorter and narrower (these measurements for length are the exposed lateral margins). There are also discrepancies in the size and proportions of the thoracic segments in the female (see table of measurements).

The paramers are much longer but very little wider (0.13 by 0.053 against 0.097 by 0.04); the endomeres are about the same length but more than twice the width; the mesothoracic sternal plate is of a decidedly different shape and chaetotaxy (see figure). The number of teeth in the abdominal combs is also very variable, as in *heterogenitalis*, although they average nearly the same. The presence of *heterogenitalis* on *C. b. boucardi* and of a closely related subspecies of it on *C. idoneus* seems to be rather conclusive proof that *C. idoneus* may be conspecific with *C. boucardi*, and not *C. cinnamomeus*, as given by Peters.

MEASUREMENTS OF RHOPALOCERAS HETEROGENITALIS SPATULATA

Structure	Male		Female	
	Length	Width	Length	Width
Body	2.70		3.58	
Head: frons	0.90	0.74	1.06	0.78
Head: temples		1.39		1.60
Prothorax	0.32	0.87	0.37	0.97
Mesothorax	0.32	1.00	0.39	1.13
Metathorax	0.15	1.07	0.17	1.26
Abdomen	1.30	1.19	1.97	1.41
Antennae	0.59	0.09	0.41	0.087
Paramers	0.13	0.053		
Endomeres	0.217	0.075		

NUMBER OF TEETH IN ABDOMINAL COMBS

Male		Female	
Left	Right	Left	Right
14	15	19	16
13	13	13	15
12	10	13	13
6	9	12	12
5	4	7	6

RHOPALOCERAS LATICEPS BONAPARTI, new subspecies

FIGURE 10, *d*

Types.—Male and female, adults, from *Nothocercus bonaparti*, collected by the author at Tierra Nueva, Sierra Perijá, Colombia, in July 1941; in U. S. National Museum.

Diagnosis.—This race does not differ strikingly from *R. l. abbreviatus*. The shape, markings, and chaetotaxy of the head and body segments are very similar, although *bonaparti* is slenderer; the sternal thoracic plate is of the same shape, but the hairs attached to it are longer, as are the hairs at the posterolateral angles of the abdomen.

The male genital armature, while of the same type, differs markedly as to proportions and detail, but the genital apparatus of the female is practically identical with that of *abbreviatus*, the differences being too small to be worthy of illustration. The measurements of the male as compared with Piaget's for *laticeps* show the length to be more in all segments except the abdomen, which is less (this length is not always reliable), while the head and thorax are very much wider in *bonaparti*. As compared with *R. l. abbreviatus*, there are

numerous differences in size, and especially proportion, *bonaparti* averaging slenderer throughout. The number of teeth in the abdominal combs of the male falls within the extremes for *abbreviatus*, some having one more than the maximum and others one less than the minimum. In the female they average fewer in number in practically all the combs.

MEASUREMENTS OF RHOPALOCERAS LATICEPS BONAPARTI

Structure	Male		Female	
	Length	Width	Length	Width
Body	3.08	----------	4.17	
Head	1.08	1.58	1.28	1.97
Prothorax	0.33	1.02	0.44	1.17
Mesothorax	0.37	1.15	0.41	1.34
Metathorax	0.19	1.24	0.22	1.58
Abdomen	1.39	1.34	2.17	1.58
Antennae	0.70	0.115	0.45	0.097
Paramers	0.24	0.16	----------	
Endomeres	0.22	0.11	----------	

NUMBER OF TEETH IN ABDOMINAL COMBS

Male		Female	
Left	Right	Left	Right
17	16	17	16
14	13	16	15
11	12	16	15
9	10	11	11
4	4	5	5

RHOPALOCERAS species(?)

A single male of this genus was taken on *Crypturellus garleppi affinis*, collected by the author at Todos Santos, Río Chaparé, Bolivia. The specimen is in poor condition and has the genital armature mutilated, and so it is impossible to describe or figure it accurately, although it seems to be an undescribed form.

Genus HEPTAPSOGASTER Carriker

HEPTAPSOGASTER MANDIBULARIS Carriker

FIGURE 11, *a*

Heptapsogaster mandibularis CARRIKER, Lice of the tinamous, p. 116, pl. 16, figs. 2–2b, 1936. (Host: *Crypturellus t. tataupa.*)

The original description and figures given for this species are full and correct, with exceptions that follow and that now prove

to be of unusual importance in separating the species of this particular section of the genus.

The genital armature was poorly described, owing to the fact that the single male (the type) was in poor condition, with the genitalia impossible to distinguish clearly or properly interpret. I have since secured two fine males from the type host, collected at Samaipata, Bolivia, which have been carefully compared with the type. These two specimens are a trifle larger, but otherwise identical with the type, and a correct delineation of the genitalia has been prepared from one of them. The original figure was fairly correct (Carriker, 1936, pl. 16, fig. 2b) as to the basal plate, and paramers, but the drawing of the endomeral plate was very misleading.

One character of the endomeral plate is not always visible, that is, the sac that fills the space between the two lateral prongs and that extends distally a varying distance beyond them, according to the different subspecies. In some of the races of *mandibularis* there are no strengthening bars of chitin within this sac, while in others they are present, while its walls are so thin and transparent that they are often very difficult to differentiate.

The presence in the Mexican material of two races of *mandibularis*, two of *H. temporalis*, and the undescribed species *inexpectata*, has made necessary a complete revision of the *mandibularis-temporalis* group. The second error in the description of *H. mandibularis* was the incorrect description of the chaetotaxy of the abdominal pleurites, which now proves to be of vital importance, especially the presence or absence of certain short, thickened spines. In the male we have the following: Pleurite I has no hairs or spines (this enumeration does not include the hairs at the posterolateral angle of the pleurite); II and III have one spine and one hair; IV and V have three hairs. This arrangement of hairs and spines is one of the essential characters for the separation of *all* races of *H. mandibularis* from *all* races of both *H. temporalis* and *H. inexpectata*.

The males of both *H. mandibularis* and *H. inexpectata* have the crescent-shaped "scent gland" on the fifth abdominal pleurite, while *H. temporalis* has the flower-shaped glands on segments IV and V. The females of these three species are separated on the chaetotaxy of the abdominal pleurites and tergites and the character of the last abdominal segment. We have the following known races of *H. mandibularis:*

HEPTAPSOGASTER MANDIBULARIS MODESTAE, new subspecies

FIGURE 11, *b*, *c*

Types.—Male and female, adults, from *Crypturellus b. boucardi*, collected by the author on Cerro Tuxtla, Veracruz, Mexico, March 28, 1940; in U. S. National Museum.

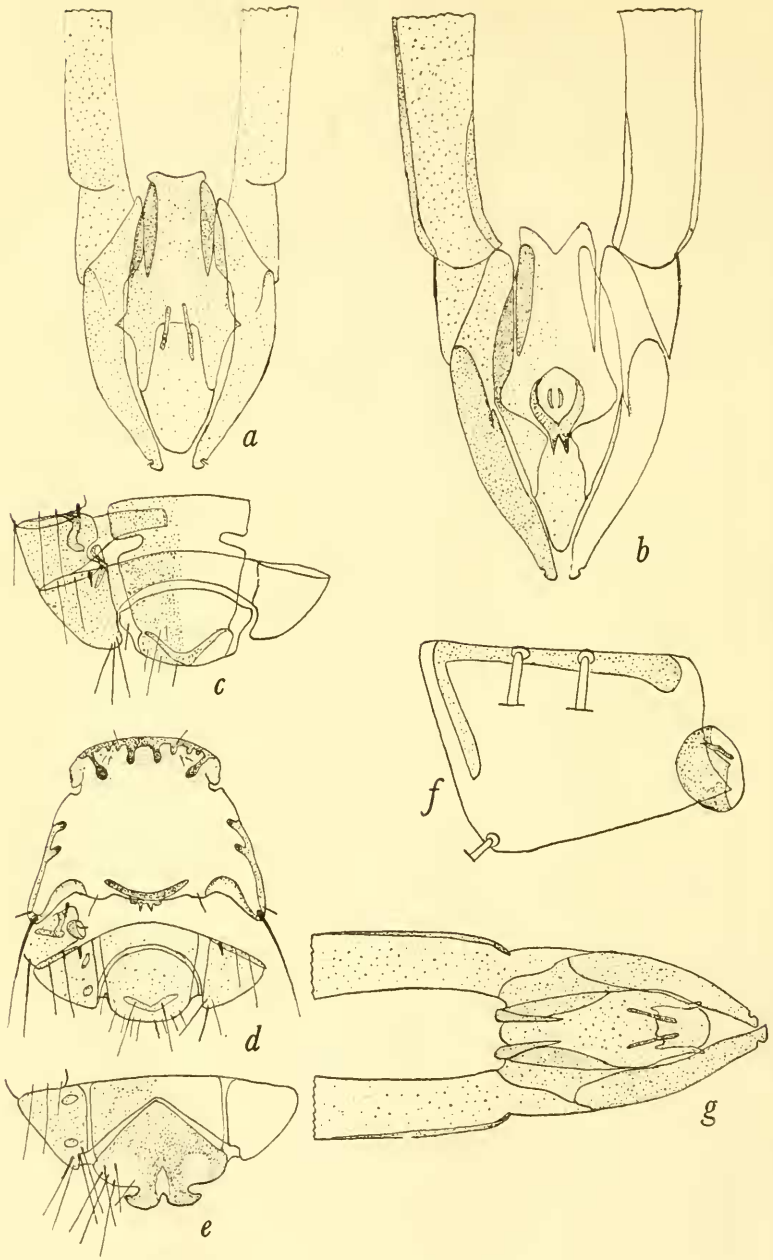

FIGURE 11.—HEPTAPSOGASTER

a, *Heptapsogaster mandibularis mandibularis* Carriker: Male genitalia.
b, *c*, *H. m. modestae*, new subspecies: *b*, Male genitalia; *c*, abdomen of female.
d–*g*, *H. m. tapicollae*, new subspecies: *d*, Male head and tip of abdomen; *e*, tip of female abdomen; *f*, scent gland; *g*, male genitalia.

This subspecies differs from the nominate form and from the one that follows chiefly in its much larger size and the male genitalia. The "scent" gland is small (that of *mandibularis* is smallest of all the races known), is of a simple crescent shape, and lies within the deeply incised margin of pleurite V, like *mandibularis*. There is a slight difference in the shape of the last abdominal segment of the male. The female seems to be impossible to separate from the female of *mandibularis*, except in size and porportions.

MEASUREMENTS OF HEPTAPSOGASTER MANDIBULARIS

Structure	*mandibularis* (types)				*modestae*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.13	------	1.29	------	1.48	------	1.61	
Head	0.357	0.44	0.39	0.45	0.42	0.57	0.42	0.61
Prothorax	0.124	0.24	0.13	0.26	0.15	0.305	0.16	0.33
Mesothorax	0.12	0.43	0.13	0.45	0.15	0.58	0.16	0.61
Metathorax	0.086	0.42	0.097	0.43	0.11	0.55	0.16	0.57
Abdomen	0.62	0.51	0.74	0.57	0.71	0.68	0.96	0.76
Antennae (first segment in male)	0.075	0.053	0.195	------	0.11	0.087	0.203	
Paramers	0.09	0.08	------	------	0.11	0.097	------	

HEPTAPSOGASTER MANDIBULARIS TAPICOLLAE, new subspecies

FIGURE 11, *d–g*

Types.—Male and female, adults, from *Crypturellus soui meserythrus*, collected by the author on Cerro Tuxtla, Veracruz, Mexico, May 8, 1940; in U. S. National Museum.

The male differs from *mandibularis* and *modestae* in having the temples much less divergent, and from *modestae* in smaller size. Unlike *mandibularis*, abdominal segment VII is deeply imbedded within VI, and is also of different shape.

The genital armature is nearer to that of *mandibularis*, except that the endomeral plate is much wider, with longer prongs and sac. The female seems to be impossible to separate except by measurement, although the temples are much less divergent. The "scent" gland in the male is of the same general shape as the previous two races but much larger, extending into pleurite VI, while sclerite V is *not incised* to receive it, as in *mandibularis* and *modestae*, but it lies just under the inner edge of the plate, with seemingly a short duct leading from it to the surface (see figure).

MEASUREMENTS OF HEPTAPSOGASTER MANDIBULARIS TAPICOLLAE

Structure	Male		Female	
	Length	Width	Length	Width
Body	1.11		1.37	
Head	0.35	0.46	0.40	0.49
Prothorax	0.13	0.24	0.13	0.28
Mesothorax	0.13	0.44	0.13	0.53
Metathorax	0.09	0.46	0.12	0.45
Abdomen	0.57	0.54	0.70	0.61
Antennae (first segment in male)	0.09	0.055	0.174	
Paramers	0.08	0.075		

HEPTAPSOGASTER MANDIBULARIS NOCTIVAGI Clay

Heptapsogaster stultus noctivagus CLAY, Proc. Zool. Soc. London, ser. B, 1937, p. 138, fig. 2d. (Hosts: *Crypturellus n. noctivagus*, Brazil, and *C. noctivagus dissimilis*, British Guiana.)

The fact that the chaetotaxy given for the male of this race agrees with that given by Miss Clay for the male of *H. stultus* proves beyond doubt that the male is a race of *mandibularis* and not of *inexpectata* (equals *stultus* of Clay) (see notes under *H. mandibularis stultus* Clay), while her statement that the seventh abdominal segment in the female is that of *H. mandibularis* Carriker proves that the female belongs also to a race of *mandibularis*, since all known races of *inexpectata* have a similar seventh abdominal segment, as do all races of *mandibularis* and *temporalis*.

The description of the chaetotaxy of the female agrees with that of the female of *mandibularis*, and not of *inexpectata*, but there is one slight discrepancy between Miss Clay's description and my own observations. She gives for segment III, two hairs and one spine on the pleurite, which should be (according to my description), one hair and two spines. The spine next to the hair on this pleurite is longer than the other spine, and a trifle slenderer, but nevertheless a spine, rather than a hair.

Miss Clay has mentioned also a character in this species that I had never noticed before, that is, the presence of a "scent" gland in the *female* on the inner edge of pleurite V, which is incised to receive it. Further investigation shows that not only *H. mandibularis* possesses this character, but also *H. inexpectata* and *H. temporalis*, the gland in the latter being of a thickened crescent shape, instead of flowerlike as in the male.

HEPTAPSOGASTER MANDIBULARIS STULTUS Clay

Heptapsogaster stultus stultus CLAY, Proc. Zool. Soc. London., ser. B, 1937, p. 136 (*partim*—♂), fig. 4b, pl. 1, fig. 3. (Host: *Crypturellus o. obsoletus*, Argentina.)

In the description of this species Miss Clay has made a regrettable but quite excusable error in that she has described the male of one species and the female of another. Her male is undoubtably an undescribed race of *H. mandibularis*, while the female is correctly identified as a new species, being that form mentioned by me under my "remarks" concerning *H. mandibularis*, as the form taken along with *mandibularis*, and for that reason could not be classed as a subspecies of it (*mandibularis*) (Carriker, 1936, p. 118).

The name *stultus*, proposed for these two parasites, must therefore be restricted to the male, it being the first one described, and it therefore becomes *H. mandibularis stultus* Clay. (See descriptions of chaetotaxy under *H. mandibularis* Carriker and *H. inexpectata*, new species, for substantiation of above statement.)

The female of *H. stultus* Clay (1937, p. 136) therefore remains without a name, which is unfortunate, in that the description of this interesting species must rest solely on the female, the male being unknown, at least of the nominate form. I have in my collection, however, males and females of this new form from four different hosts, representing several different races, but unfortunately none from *Crypturellus o. obsoletus*.

I therefore propose for the female of *H. stultus* Clay (1937, p. 136) the name *Heptapsogaster inexpectata*, which will be treated on a subsequent page.

HEPTAPSOGASTER MANDIBULARIS GARLEPPI, new subspecies

FIGURE 12, *a–d*

Types.—Male and female, adults, from *Crypturellus garleppi affinis*, collected by the author at Todos Santos, Río Chaparé, Bolivia, August 2, 1937; in collection of author.

This race of *mandibularis* has the front flattened, not rounded, as in the nominate form, while the male genitalia differ from all the other races here treated. It falls into the group containing *mandibularis* and *modestae* as regards size but differs from *modestae* in the shape of the endomeral prongs, which are slender, as in *mandibularis*. From *mandibularis* it differs in having longer, less incurved paramers, heavier secondary lateral endomeral plates, and in the absence of strengthening chitin struts in the endomeral sac, this latter being invisible in specimens examined.

The head of the male is perhaps closest in shape to that of *H. m.*

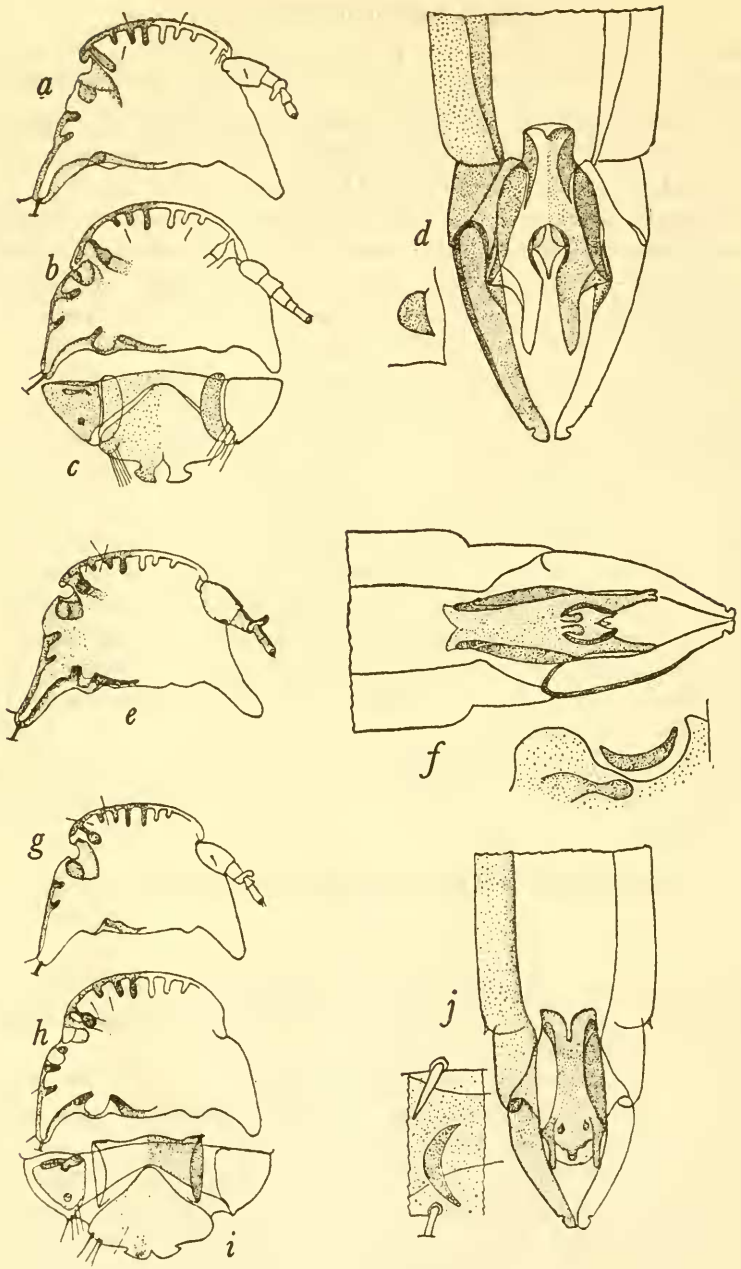

FIGURE 12.—HEPTAPSOGASTER

a–d, *Heptapsogaster mandibularis garleppi*, new subspecies: *a*, Male head; *b*, head of female; *c*, tip of female abdomen; *d*, male genitalia and scent gland.

e, *f*, *H. m. yapurae*, new subspecies: *e*, Male head; *f*, male genitalia and scent gland.

g–j, *H. m. nigriceps*, new subspecies: *g*, Male head; *h*, female head; *i*, tip of female abdomen; *j*, male genitalia and scent gland.

yapurae, from which it differs in having the general line of the sides of the head straight (but slightly undulating), while in *yapurae* there is a marked convexity just back of the antennal fossae, and the temples are decidedly concave on both outer and inner margins. The scent gland is short and much thickened (see fig.), differing from all the other races.

The measurements of this race are given together with *H. m. yapurae*, which follows.

HEPTAPSOGASTER MANDIBULARIS YAPURAE, new subspecies

FIGURE 12, *e*, *f*

Type.—Male, adult, from *Crypturellus undulatus yapura*, collected by the author at Puerto Yessup, Peru, February 19, 1930; in collection of author.

Diagnosis.—This race is represented by a single male, the type. It is distinguished by the wide, flattened front of the head, concave, slender, rather widely divergent temples, and by characters of the male genitalia.

The genitalia are of medium size, narrow at base of paramers, and with wide basal plate; the endomeral plate is also narrow, with slender secondary, lateral plates (more or less superimposed); short, slender, divergent prongs and crescent-shaped internal chitin struts. The scent gland is long and narrow, very similar in this respect to *H. m. nigriceps*.

MEASUREMENTS OF HEPTAPSOGASTER MANDIBULARIS

Structure	*garleppi*				*yapurae* (male)	
	Male		Female			
	Length	Width	Length	Width	Length	Width
Body	1.30		1.49		1.41	
Head	0.40	0.56	0.42	0.54	0.41	0.564
Prothorax	0.14	0.28	0.15	0.31	0.15	0.303
Mesothorax	0.15	0.53	0.175	0.55	0.175	0.575
Metathorax	0.14	0.51	0.13	0.51	0.13	0.54
Abdomen	0.705	0.63	0.86	0.64	0.77	0.67
Antennae	0.24	0.065	0.20	0.045	0.25	0.076
Paramers	0.12	0.098			0.133	0.08
Endomeral plate	0.12	0.075			0.112	0.04

HEPTAPSOGASTER MANDIBULARIS NIGRICEPS, new subspecies

FIGURE 12, *g–j*

Types.—Male and female, adults, from *Crypturellus soui nigriceps*, collected by the author at Tamborapa, Peru, July 14, 1933; in collection of author.

Diagnosis.—Represented by a single pair, the types. The front of the head is flattened also in this race but is much narrower than either *yapurae* or *garleppi* and has the sides of front more abruptly curving backward to the trabecular tubercles; the sides of head are quite straight, with temples but slightly divergent, and pointed. The male head is quite similar to that of *H. m. crucis* (see fig.), both as to small size and shape, but differs as to detail. In the female abdominal segment VII has the apical protuberances short and the sides more concave than in the other races, while the genital sclerites are narrow and pointed at both ends. The male genitalia are distinguished by the very short, slender paramers, proportionately large endomeral plate, large secondary lateral endomeral sclerites, and very short, straight, slender apical prongs on endomeral plate. There also seems to be present a short penis (not present in other races), while there are no internal strengthening struts in endomeral plate. The scent gland is long, narrow, and crescent-shaped, as in *yapurae*.

Measurements are given with those of *H. m. crucis*.

HEPTAPSOGASTER MANDIBULARIS CRUCIS, new subspecies

FIGURE 13, *a*, *b*

Type.—Male, adult, from *Crypturellus obsoletus crucis*, collected by the author at Samaipata, Bolivia, November 14, 1937; in collection of author.

Diagnosis.—Represented by a single male, the type. The head is very similar in shape to that of *H. m. nigriceps*, except that the front is less flattened, the sides undulating, and the trabecular tubercles strongly developed (very small in *nigriceps*), almost filling the antennal fossae. The male genitalia are of medium size, with paramers slender, sharply bent inward at tips, and strongly concave. This concavity of the outer edge of the paramers is more marked in *crucis* than in any other known race of *mandibularis*. The endomeral plate is long and wide, two-thirds of which is composed of the apical prongs, which are the longest of any known race and are decidedly *divergent* at their tips. The lateral endomeral sclerites are well developed and *not* superimposed. Scent gland of medium size, slender, and but slightly crescent-shaped.

Remarks.—It would be naturally supposed that this race would be the same as or very close to *H. m. stultus* Clay, from *Crypturellus o. obsoletus* (Argentina), but they are quite different, at least in the male genitalia, *crucis* having the endomeral prongs wider and longer than in any other known race of *mandibularis*. In *H. m. stultus*, the prongs are very slender, parallel-sided, and curving *inward*, not outward. The head also seems to be of slightly different shape.

MEASUREMENTS OF HEPTAPSOGASTER MANDIBULARIS

Structure	*nigriceps*				*crucis* (male)	
	Male		Female			
	Length	Width	Length	Width	Length	Width
Body	1.17	----------	1.43	----------	1.13	
Head	0.37	0.468	0.39	0.51	0.38	0.50
Prothorax	0.13	0.27	0.13	0.303	0.12	0.26
Mesothorax	0.175	0.50	0.18	0.53	0.17	0.456
Metathorax	0.113	0.47	0.12	0.50	0.12	0.435
Abdomen	0.61	0.597	0.81	0.67	0.58	0.55
Antennae	0.22	0.055	0.205	0.043	(incomplete)	
Paramers	0.09	0.066	----------	----------	0.115	0.094
Endomeral plate	0.095	0.038	----------	----------	0.115	0.056

HEPTAPSOGASTER MANDIBULARIS IDONEUS, new subspecies

FIGURE 13, *c–f*

Types.—Male and female, adults, from *Crypturellus idoneus*, collected by the author at El Bosque, Sierra Perijá, Colombia, June 14, 1941; in U. S. National Museum.

Diagnosis.—This is a well-defined race, represented in the collection by a large series of both sexes. The shape of the head somewhat resembles that of *H. m. garleppi*, with long, widely divergent temples and nearly straight (slightly convex) sides. It differs from *garleppi* in the narrower, more convex front, larger trabecular tubercles, shape of the depression at inner side of antennal fossae, and in having sides of temples uniformly, though but slightly, convex, while in *garleppi* they are straight, but undulating.

The head in the female is also much larger than that of *garleppi*, with more *flattened frons*, larger trabecular tubercles, more convex temples, which are much thinner at their tips (see figure). The last abdominal segment in the female is similar in shape to *garleppi*, but the genital sclerites have almost straight, parallel sides, and the anterior end is *truncate*.

The male genitalia rather resemble those of *yapurae* in size and shape of paramers, but the basal plate is narrower. The endomeral plate is longer and more deeply inserted within the basal plate, while the endomeral prongs are much longer and thicker and have a transverse, chitinized plate across their bases, instead of internal, crescent-shaped struts. The scent gland is long and narrowly crescent shaped, as in *nigriceps*.

Remarks.—This race has the head with many features resembling *modestae* (from *C. b. boucardi* of Mexico), but the genital armature is quite different and apparently unique among the races of *mandibularis*.

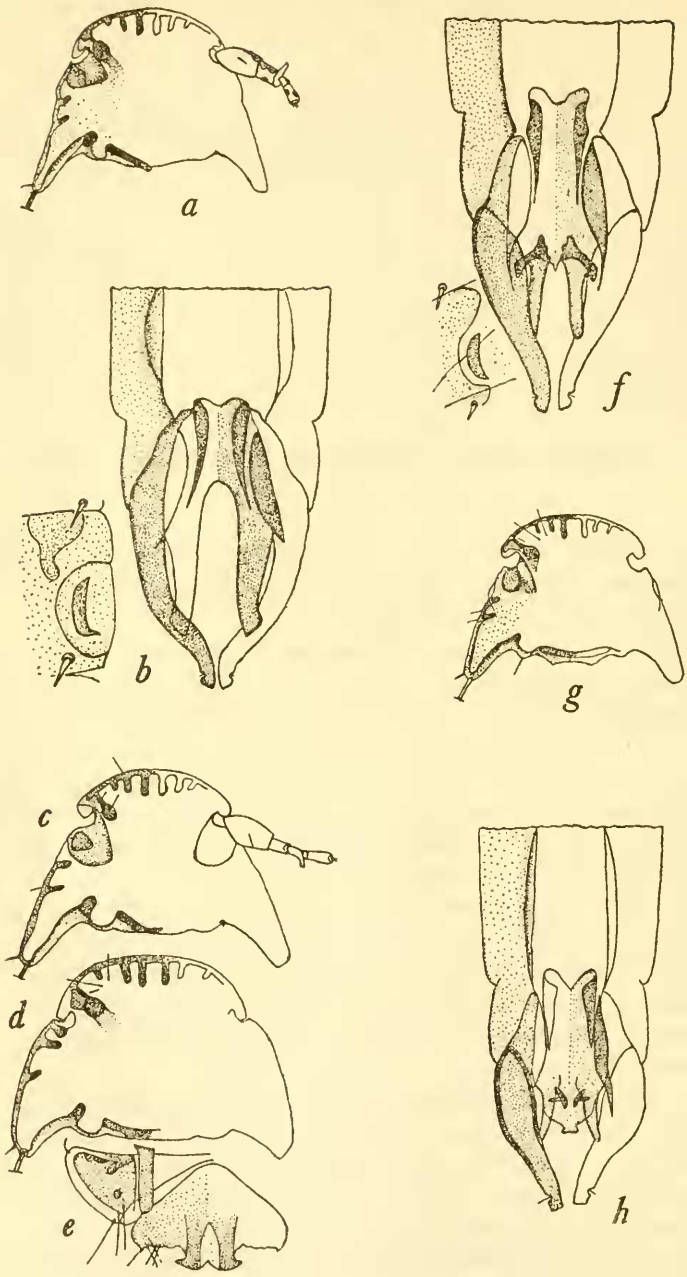

FIGURE 13.—HEPTAPSOGASTER

a, *b*, *Heptapsogaster mandibularis crucis*, new subspecies: *a*, Male head; *b*, male genitalia and scent gland.

c–*f*, *H. m. idoneus*, new subspecies: *c*, Male head; *d*, female head; *e*, tip of female abdomen; *f*, male genitalia and scent gland.

g, *h*, *H. m. motilonensis*, new subspecies: *g*, Male head; *h*, male genitalia.

The female is close to that of *mandibularis*, differing but slightly in shape of temples and length of internal projections from the *frons*.

Measurements are given with those of *H. m. motilonensis*.

HEPTAPSOGASTER MANDIBULARIS MOTILONENSIS, new subspecies

FIGURE 13, *g*, *h*

Types.—Male and female, adults, from *Crypturellus soui* (*musteli-nus* ?), collected by the author at Airoca,[6] Sierra Perijá, Colombia, April 7, 1942; in U. S. National Museum.

Diagnosis.—Represented by the pair of types and a second female, taken on the same host, at Tierra Nueva, Sierra Perijá, Colombia, in 1941. The head of the male in this race closely resembles that of *H. m. nigriceps* (from *C. soui nigriceps*), except that the frons is some narrower and more convex and the temples are slightly more divergent. The female also has the head close to that of *nigriceps*, but the apical prongs on abdominal segment VII are much longer, as in *idoneus*. The male genitalia resemble superficially those of *yapurae*, except that the paramers are shorter and proportionately wider at their bases. The endomeral plate is very similiar, as well as the apical prongs, but there seems to be a small penis present, as in *nigriceps*, while the internal, chitinized struts are different from those of *yapurae*. The scent gland is of the type of *garleppi*, short but less thickened.

MEASUREMENTS OF HEPTAPSOGASTER MANDIBULARIS

Structure	*idoneus*				*motilonensis*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.32		1.60		1.08		1.32	
Head	0.42	0.56	0.423	0.57	0.348	0.456	0.37	0.50
Prothorax	0.15	0.303	0.15	0.326	0.12	0.25	0.13	0.27
Mesothorax	0.185	0.575	0.195	0.586	0.174	0.46	0.14	0.50
Metathorax	0.13	0.524	0.14	0.55	0.108	0.42	0.12	0.466
Abdomen	0.684	0.64	0.92	0.73	0.55	0.52	0.76	0.586
Antennae	0.25	0.068	0.20	0.043	0.215	0.055	0.174	0.033
Paramers	0.143	0.114			0.102	0.072		
Endomeral plate	0.123	0.051			0.08	0.04		

HEPTAPSOGASTER INEXPECTATA INEXPECTATA, new name

Heptapsogaster stultus stultus CLAY, Proc. Zool. Soc. London, ser. B, 1937, p. 136 (partim,-♀), fig. 2c, pl. 1, fig. 4. (Host: *Crypturellus o. obsoletus*, Argentina.)

The descriptions and figures given by Miss Clay for the female of *H. s. stultus* are ample for the recognition of the species, but without

[6] Airoca is a small hamlet ("rancheria") of the very primitive Motilón Indians, where the author spent a month in 1942, hence the name *motilonensis*.

the male and a figure of the genitalia it will be difficult to separate the other races from it, although the shape of the head and measurements given will be of considerable assistance.

The male of *inexpectata* is superficially very close to that of *H. mandibularis*, both being more or less of the same size, shape, sexual dimorphism, and markings and both with the same type of scent gland on the fifth abdominal pleurite. However, it may be separated from all races of *mandibularis* by the following characters:

The endomeral plate lacks the lateral prongs at its distal end, and the sac that lies between them, these being replaced by a bifurcated projection in the median portion of the transverse, posterior margin, or else a single median projection of varying shape, which may be the penis. A second character present in *all* males of *inexpectata* I have seen is the arrangement of the short, heavy spines on the dorsal surface of the abdomen. There is a spine just *inside* the inner edge of pleurite IV, near its posterior margin; a second spine is just *outside* the inner edge of pleurite III, also near its posterior margin, while a third spine is on the posterior margin of the second tergite, some distance inside the pleurite, so that the three spines are almost on a diagonal line with each other. (Note arrangement of spines under description of *H. mandibularis* and *H. temporalis*.)

The females of *inexpecata* are very similar to those of *H. mandibularis* and *H. temporalis*, except in two characters, by which each of the three may be easily distinguished, viz: the shape of abdominal segment VII and the chaetotaxy of the pleural plates of the abdomen. In *inexpectata* abdominal segment VII protrudes but slightly beyond VI, is almost transverse on its posterior margin (only a slight rounded median projection), but also has a narrow, elongated, median emargination, the entrance to which is practically closed. There are four abdominal spines, all on the posterior margin of the *tergal* plates of segments II to V, the one on V being at the inner edge of the pleurite, with each succeeding spine set farther inward, toward the center of the abdomen, so the four spines form diagonal lines across the abdomen converging toward the thorax.

There are minor characters for separating the races of each species, such as size and proportion of the various body segments, but there are cases where the females of the different races are very difficult to differentiate, and then only by careful measurements and comparison with actual specimens. The figures given will serve better for distinguishing these differences between closely allied forms than pages of lengthy description.

HEPTAPSOGASTER INEXPECTATA TUXTLAE, new subspecies

FIGURE 14, *a-d*

Types.—Male and female, adults, from *Crypturellus b. boucardi*, collected by the author on Cerro Tuxtla, Veracruz, Mexico, March 28, 1940; in U. S. National Museum.

Diagnosis.—A comparison of the figure of the male genitalia of this race with that given by Miss Clay for *H. s. stultus* (= *H. mandibularis stultus*) will show that they are of an entirely different type, at least the endomeral plate.

The male of this race is essentially like the description given above for that of *inexpectata*, and it may be separated from other races of the species by the male genitalia, shape and size of various body segments, and size and shape of the scent gland, which always seems to differ slightly in the different races. The female may be separated from the nominate form by the shape of the head and the antennae. The head is very similar in shape to that of *H. mandibularis noctivagi* Clay, except that the temples are very much narrower and pointed. The shape of the trabecular tubercles is another diagnostic character for the females of *inexpectata* (mentioned by Miss Clay), those of *inexpectata* being truncate on the posterior margin, while in *mandibularis* they are bluntly pointed and longer.

The female of *tuxtlae* is larger in all porportions than that of *inexpectata*, but the differences are not great, except for the head, which is considerably longer and some wider (see measurements), the other measurements not differing more than could be taken care of under individual variation.

MEASUREMENTS OF HEPTAPSOGASTER INEXPECTATA

Structure	*tuxtlae*				*inexpectata* (female)	
	Male		Female			
	Length	Width	Length	Width	Length	Width
Body	1.13		1.35		1.30	
Head	0.36	0.47	0.38	0.49	0.32	0.47
Prothorax	0.13	0.28	0.13	0.30	0.12	0.28
Mesothorax	0.13	0.50	0.13	0.51	0.23	0.47
Metathorax	0.12	0.50	0.13	0.50		
Abdomen	0.58	0.62	0.76	0.64	0.74	
Antennae (first segment)	0.097	0.055	[1] 0.17			
Paramers	0.09	0.075				

[1] Total.

Remarks.—In the males of *H. inexpectata* there are two strong hairs on the occipital margin of the head, one at the edge of the pro-

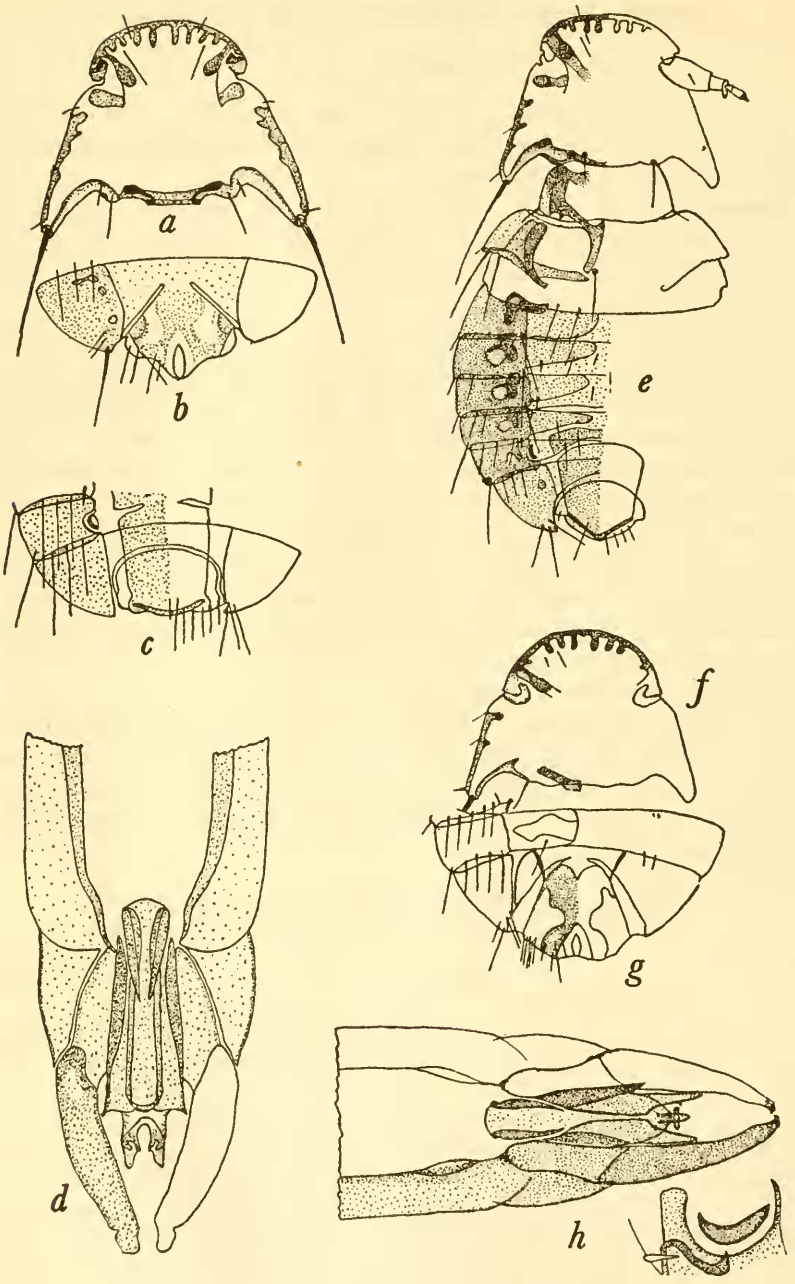

FIGURE 14.—HEPTAPSOGASTER

a–d, *Heptapsogaster inexpectata tuxtlae*, new subspecies: *a*, Male head; *b*, tip of female abdomen; *c*, tip of male abdomen; *d*, male genitalia.

e–h, *H. i. undulata*, new subspecies: *e*, Body of male; *f*, female head; *g*, tip of female abdomen; *h*, male genitalia and scent gland.

thorax and the other on the dorsal surface, inside the occipital band. The female apparently lacks the one on the dorsal surface, while the other is sometimes reduced to a spine.

HEPTAPSOGASTER INEXPECTATA UNDULATA, new subspecies

FIGURE 14, *c–h*

Types.—Male and female, adults, from *Crypturellus u. undulatus*, collected by the author at Rurrenabaque, Río Beni, Bolivia, September 11, 1934; in collection of author.

Diagnosis.—Represented by the types and a female paratype. Very much smaller in all proportions than *H. i. tuxtlae*, the male with front more flattened, sides of temples straight (instead of convex), with the tip of the last abdominal segment rounded and with the submarginal chitinized band V-shaped instead of flatly crescent-shaped.

In the female the seventh segment is also of a very different shape, as well as the genital plate (see fig.). The male may be recognized at once by the shape of the endomeral plate, the tip of which is elongated oval (not truncated), and with what is apparently a small penis, bearing a median cross bar. The paramers are shorter and slenderer than in *tuxtlae*, much resembling those of *H. i. benii;* in fact, the whole genital armature is much smaller and especially slenderer than in *tuxtlae*. The scent gland is of the conventional type of several races of *H. mandibularis*, of a slender, somewhat crescent shape. A male and four females taken on *C. undulatus yapura*, collected at Puerto Yessup, Peru, seem to be exactly the same; at least the male genital armature is. Measurements are given with those of *H. i. benii*.

HEPTAPSOGASTER INEXPECTATA BENII, new subspecies

FIGURE 15, *a–d*

Types.—Male and female, adults, from *Crypturellus soui inconspicuus*, collected by the author at Chiñiri, Río Beni, Bolivia, September 3, 1934; in collection of author.

Diagnosis.—Represented by the types and one female paratype. This race is also close to *H. i. tuxtlae*, both in male genital armature and other characters. The scent gland is somewhat different, as well as the shape of the last abdominal segment in the female.

The metathorax is angulated on the posterior margin, with each side *straight* to the rounded posterolateral angle. In the male the third segment of the antennae is strongly hooked; in the female there are four short spines on abdominal tergites II to V, all inside of the pleural plates, in a line slightly converging anteriorly.

The male genital armature is the smallest of any of the known races of *inexpectata*, being especially narrow, both the basal plate and the

width at base of paramers; the endomeral plate is also shorter than in any of the known races and has the distal end of a different shape (see fig.), there being a bilobed median projection, having a bifurcated tip, which is probably the penis. There are no internal, strengthening, chitinized struts, such as the long U-shaped one in *tuxtlae*. The scent gland is rather similar to *tuxtlae*.

MEASUREMENTS OF HEPTAPSOGASTER INEXPECTATA

Structure	*undulata*				*benii*				*magdalenae*			
	Male		Female		Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.07	-------	1.35	-------	1.00	-------	1.20	-------	1.14	-------	1.30	
Head	0.357	0.475	0.38	0.50	0.336	0.42	0.357	0 456	0.38	0.48	0.35	0.477
Prothorax	0.12	0.29	0.14	0.30	0.12	0.25	0.12	0.28	0.13	0.28	0.12	0.285
Mesothorax	0.174	0.52	0.195	0.525	0.16	0.477	0.174	0.51	0.17	0.52	0.195	0.50
Metathorax	0.12	0.51	0.15	0.477	0.097	0.466	0.105	0.50	0.12	0.51	0.12	0.49
Abdomen	0.53	0.62	0.78	0.655	0.48	0.545	0.67	0.61	0.56	0.63	0.73	0.64
Antennae	0.195	0.06	0.174	0.043	0.16	0.045	0.14	0.033	0.22	0.065	0.195	0.028
Paramers	0.087	0.065	-------	-------	0.08	0.055	-------	-------	0.09	0.07	-------	
Endomeral plate	0.095	0.03	-------	-------	0.077	0.03	-------	-------	0.11	0.033	-------	

HEPTAPSOGASTER INEXPECTATA MAGDALENAE, new subspecies

FIGURE 15, *e*

Types.—Male and female, adults, from *Crypturellus idoneus*, collected by the author at Carraipia, Guajira, Colombia, May 30, 1941; in U. S. National Museum.

Diagnosis.—This race is also very close to *tuxtlae*, from *C. b. boucardi*, except that it is smaller and has the distal end of endomeral plate of a different shape, there being two median protuberances on the truncate tip that bear short prongs. The internal, U-shaped chitinized strut found in *tuxtlae* is absent. The scent gland is similar to that of *undulata*, instead of *tuxtlae*.

HEPTAPSOGASTER TEMPORALIS Carriker

Heptapsogaster temporalis CARRIKER, Lice of the tinamous, p. 118, pl. 16, figs. 1–1b, 1936. (Host: *Crypturellus u. undulatus.*)

Since the publication of my first report on the lice of the tinamous in 1936, much additional material of *H. temporalis* has been examined, which shows that it is widely distributed on the avian genus *Crypturellus* and is often found in company with *H. mandibularis* or *H. inexpectata*, but I have not yet taken the three species on the same indi-

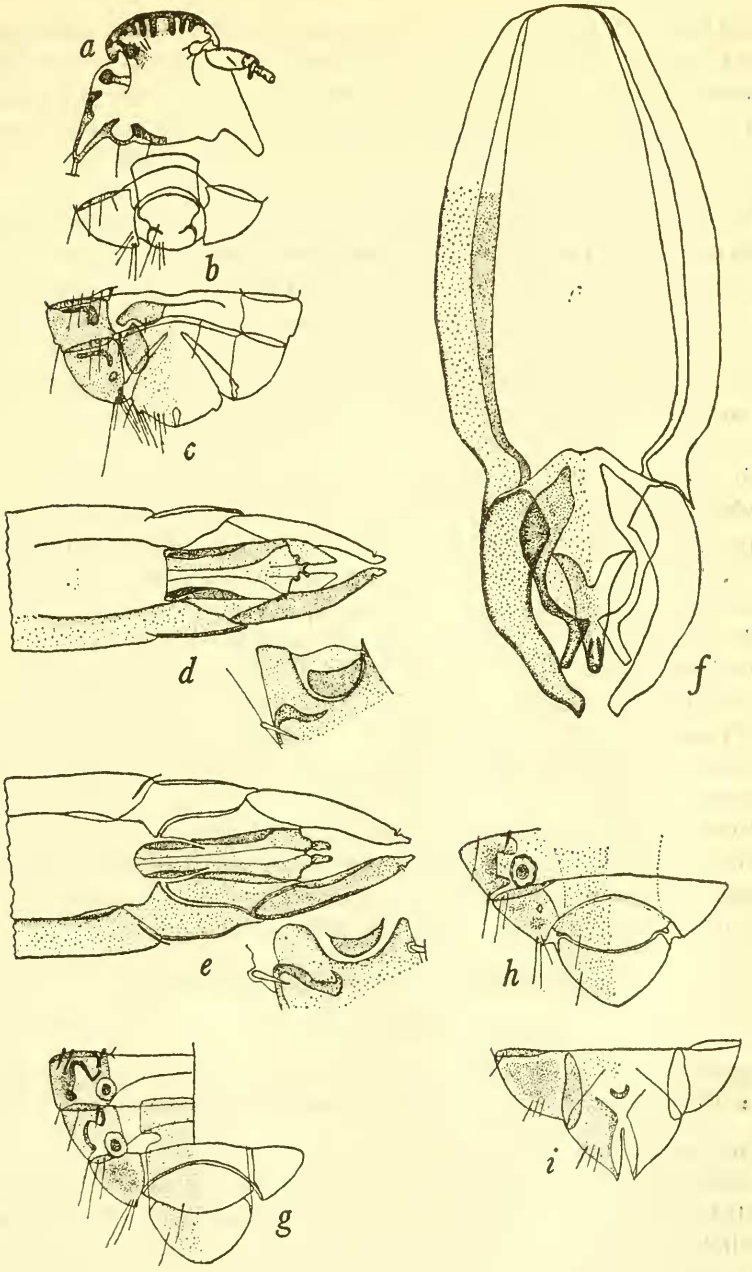

FIGURE 15.—HEPTAPSOGASTER

a–d, *Heptapsogaster inexpectata benii*, new subspecies: *a*, Male head; *b*, tip of male abdomen; *c*, tip of female abdomen; *d*, male genitalia and scent gland.

e, *H. i. magdalenae*, new subspecies: Male genitalia and scent gland.

f, *g*, *H. temporalis acutiventris* Clay: *f*, Male genitalia; *g*, tip of male abdomen.

h, *i*, *H. t. boucardi*, new subspecies: *h*, Tip of male abdomen with scent gland; *i*, tip of female abdomen.

vidual host. Superficially it much resembles both of the above-mentioned species, but both sexes possess characters that make their identification positive, especially the male, in which the outstanding character is the presence of *two* scent glands of a most unusual appearance on abdominal pleurites IV and V. (Carriker, 1936, p. 53, pl. 12, fig. 3.)

The female may be distinguished by the shape of the last abdominal segment and by the presence of three short, thickened spines on the posterior margin of abdominal pleurites II and III. The last abdominal segment extends far beyond the sixth, is much narrower, is circular on the posterior margin, is slightly pointed at the tip, and has a deep, narrow, median emargination. The suture separating segments VI and VII is fused medially in all the races of *temporalis* I have seen.

An examination of the females of this species shows that, like *mandibularis* and *inexpectata*, all races have a small, somewhat crescent-shaped scent gland at the inner edge of the *first* abdominal pleurite, which is incised to receive it. Its shape is totally unlike the same gland found in the male on segments IV and V.

The female of *H. t. femininus* has abdominal segment VII more like that of the male in *H. t. temporalis*, but it is wider and shorter and is likewise fused medially with segment VI. (My pl. 16, fig. 3, in "Lice of the Tinamous," 1936, is wrong in this respect; it should be the same as in *temporalis*.) The female of *H. t. chiñirii* is unknown. However, the females are always difficult to separate, the differences being so slight that they are not always recognizable unless accompanied by their respective males, but they can always be separated from the same sex of *mandibularis* and *inexpectata* by the arrangement of the spines on the pleurites and by the shape of the last abdominal segment.

HEPTAPSOGASTER TEMPORALIS ACUTIVENTRIS Clay

FIGURE 15, *f*, *g*

Heptapsogaster temporalis acutiventris CLAY, Proc. Zool. Soc. London, ser. B, 1937, p. 135, fig. 4a, pl. 1, figs. 1, 2. (Host: *Crypturellus cinnamomeus mexicanus*.)

This subspecies differs from the nominate form as follows:

Male: The front of the head is wider and more flattened, with the whole head shorter and wider; the prothorax has the sides more nearly parallel (less divergent posteriorly); the mesothorax is porportionately wider, extending farther beyond the sides of the abdomen; abdominal segment VII is larger and of quite different shape (see fig.), being elongated posteriorly, with tip bluntly rounded, not emarginate as in *H. t. temporalis*.

The genital armature is decidedly different, as may be seen by the two figures.

Female: Decidedly larger than *temporalis* in all measurements; abdominal segment VII is similar to that of *temporalis*, but slightly longer, while the two oval, genital plates on each side in segment VI are larger. The chaetotaxy and markings of the pleurites are the same, and there seem to be no other distinguishing characters.

The measurements of my specimens do not agree with those given by Miss Clay.

MEASUREMENTS OF HEPTAPSOGASTER TEMPORALIS

Structure	*temporalis*				*acutiventris*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.08		1.24		1.20		1.34	
Head	0.347	0.415	0.35	0.44	0.336	0.46	0.338	0.50
Prothorax	0.10	0.195	0.108	0.195	0.105	0.205	0.118	0.227
Mesothorax	0.16	0.41	0.15	0.42	0.17	0.456	0.174	0.466
Metathorax	0.105	0.40	0.09	0.39	0.097	0.42	0.097	0.42
Abdomen	0.596	0.50	0.73	0.54	0.81	0.586	0.81	0.586
Antennae	0.15		0.16		0.16		0.16	

HEPTAPSOGASTER TEMPORALIS BOUCARDI, new subspecies

FIGURES 15, *h*, *i*; 16, *a*

Types.—Male and female, adults, from *Crypturellus b. boucardi*, collected by the author on Cerro Tuxtla, Veracruz, Mexico, March 29, 1940; types in U. S. National Museum.

This race is much closer to *acutiventris* than to *temporalis* and differs from the former as follows:

Male: Slightly larger in all measurements, being the largest of the three races *temporalis*, *acutiventris*, and *boucardi;* the scent glands are smaller and less well developed, and are both of same

MEASUREMENTS OF HEPTAPSOGASTER TEMPORALIS BOUCARDI

Structure	Male		Female	
	Length	Width	Length	Width
Body	1.28		1.38	
Head	0.347	0.47	0.39	0.51
Prothorax	0.118	0.227	0.13	0.127
Mesothorax	0.174	0.51	0.18	0.51
Metathorax	0.108	0.44	0.118	0.477
Abdomen	0.759	0.605	0.825	0.61
Antennae	0.195		0.17	

size, while in *acutiventris* those on pleurites V are the larger; abdominal segment VII is practically the same, but the genital armature is different, the paramers being of quite a distinct shape, although the endomeral and basal plates are fairly close (see figures).

Females are almost indistinguishable; the measurements, while mostly a little greater, are no safe criterion, although the mesothorax and metathorax are porportionately wider in *boucardi*.

HEPTAPSOGASTER TEMPORALIS CHIÑIRII Carriker

FIGURE 16, *d*

Heptapsogaster temporalis chiñirii CARRIKER, Lice of the tinamous, p. 120, pl. 16, fig. 4, 1936. (Host: *Crypturellus atrocapillus=C. garleppi affinis.*) (On fig. 16, *e*, is shown the male scent gland of *H. t. femininus* Carriker.)

This race of *temporalis* was described from three males, the female being unknown. Later additional specimens were secured from the type host, collected at Todos Santos, Río Chaparé, Bolivia, which included four males and three females. These males are like the type series in all respects, except for the tips of the paramers, which, instead of being pointed and slender, seem to be blunt and bent inward. However, they have the appearance of being abnormal, either deformed or injured, although *all* have the genitalia within the abdomen.

The female (hitherto unknown) is extremely close to that of the nominate form, so close, in fact, that it is with difficulty that they can be separated. The last abdominal segment is more acuminate apically and more rounded anteriorly, while the hairs on posterior margin are finer and perhaps shorter.

MEASUREMENTS OF HEPTAPSOGASTER TEMPORALIS

Structure	*temporalis* (female) (corrected)		*chiñirii* (female)	
	Length	Width	Length	Width
Body	1.25	----------	1.25	
Head	0.357	0.46	0.35	0.456
Prothorax	0.12	0.21	0.12	0.205
Mesothorax	0.16	0.44	0.174	0.456
Metathorax	0.10	0.42	0.11	0.39
Abdomen	0.73	0.54	0.75	0.55
Antennae	0.16	----------	0.155	

Remarks.—The measurements of these two females agree remarkably well; in fact they are closer than is sometimes found between individuals of the same species, from the *same individual host*.

HEPTAPSOGASTER TEMPORALIS NOTHOCERCAE, new subspecies

FIGURE 16, *b*, *c*, *g*

Types.—Male and female, adults, from *Nothocercus bonaparti*, collected by the author at Tierra Nueva, Sierra Perijá, Colombia, on July 16, 1941; in U. S. National Museum.

This form is close to *H. t. femininus* in the shape of the last abdominal segment of the female, and in the type of male genitalia, but differs in details. The scent glands are quite different, both as to size and shape.

A single male from *Nothocercus nigrocapillus cadwaladeri*, from Leymebamba, Peru, is so close to these specimens that there seems to be no point in attempting to separate it, the genital armature being almost identical, as well as the scent glands and other details.

The male of *nothocercae* has the metathorax sharply angulated on the abdomen, the point reaching back to the posterior margin of the first abdominal segment.

The measurements for this subspecies are given with those of *H. t. boliviensis*.

HEPTAPSOGASTER TEMPORALIS BOLIVIENSIS, new subspecies

FIGURE 16, *f*

Type.—Male, adult, from *Crypturellus obsoletus punensis*, collected by the author at Sandillani, Bolivia, November 25, 1934; in collection of author.

This race is distinguished chiefly by the very large scent glands, which cover nearly the whole length of the pleural plate and have a narrow "corolla" and large glandular center. The genital armature is also quite different from any of the known races.

MEASUREMENTS OF HEPTAPSOGASTER TEMPORALIS

Structure	*nothocercae*				*boliviensis* (male)	
	Male		Female			
	Length	Width	Length	Width	Length	Width
Body	0.95		1.11		0.94	
Head: frons		0.25				0.26
Head: temples	0.326	0.43	0.347	0.45	0.32	0.456
Head: occiput	0.28		0.29	0.29	0.27	
Prothorax	0.12	0.22	0.13	0.25	0.11	0.23
Mesothorax	0.17	0.42	0.174	0.466	0.15	0.42
Metathorax	0.13	0.38	0.13	0.41	0.09	0.38
Abdomen	0.475	0.435	0.53	0.55	0.477	0.49
Antennae	0.205	0.058	0.16	0.032	0.17	0.05
Paramers	0.076	0.054			0.087	0.054
Endomeral plate	0.074	0.03			0.073	0.032

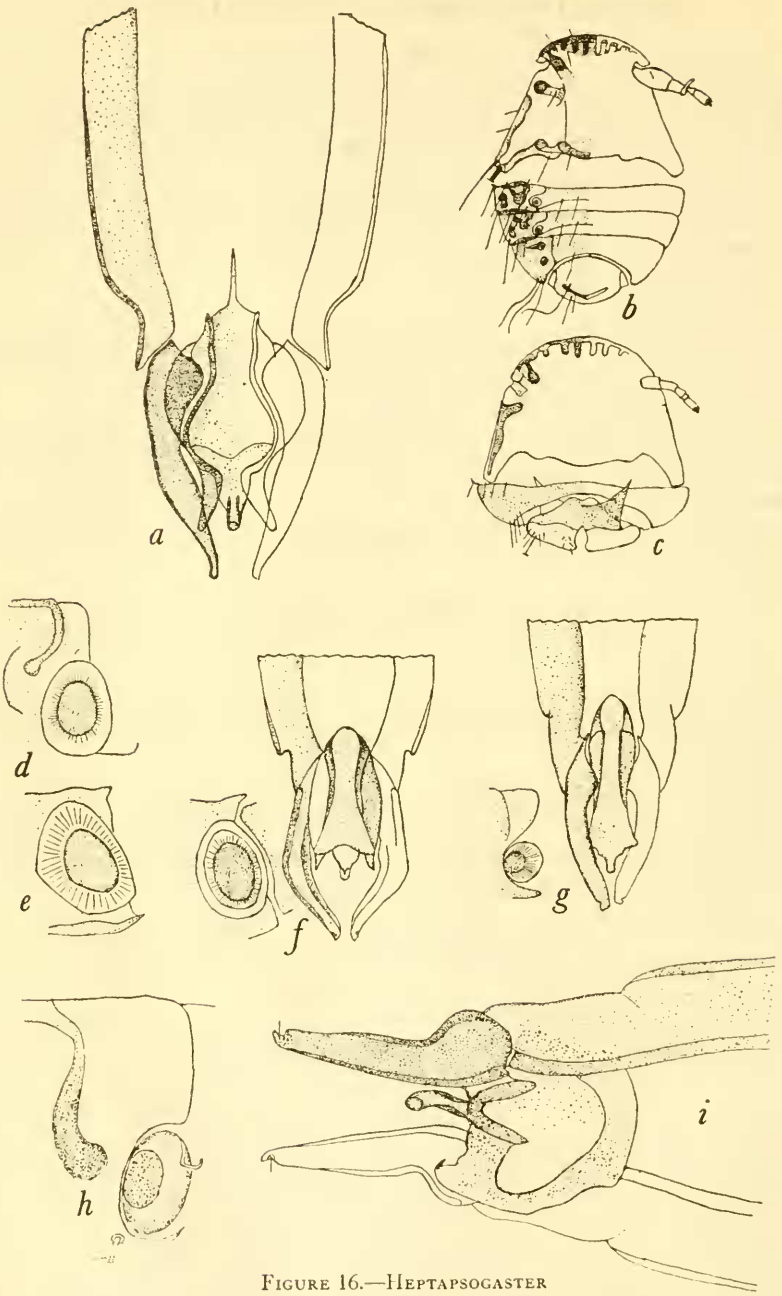

FIGURE 16.—HEPTAPSOGASTER

a, *Heptapsogaster temporalis boucardi*, new subspecies: Male genitalia.

b, *c*, *g*, *H. t. nothocercae*, new subspecies: *b*, Male head and tip of abdomen; *c*, female head and tip of abdomen; *g*, male genitalia and scent gland.

d, *H. t. chiñirii* Carriker: Male scent gland.

e, *H. t. femininus* Carriker: Male scent gland.

f, *H. t. boliviensis*, new subspecies: Male genitalia and scent gland.

h, *i*, *H. platycephalus platycephalus* Carriker: *h*, Scent gland; *i*, male genitalia.

The female is unknown, the subspecies being described from a single male, the type. The head is practically of the same width as in *nothocercae*, at both frons and temples, but is considerably longer, both at occiput and temples, and with temples proportionately longer and more pointed; the temporal bands are much more crenulated and the internal projections at the frons are somewhat shorter and thicker.

In *H. temporalis* and its races there seem to be *no hairs* whatever on the occipital margin of the head, as in *inexpectata;* however, in *H. t. femininus* there are very small bristles in the same places at which *inexpectata* has long hairs.

HEPTAPSOGASTER PLATYCEPHALUS Carriker

FIGURE 16, *h*, *i*

Heptapsogaster platycephalus CARRIKER, Lice of the tinamous, p. 120, pl. 17, figs. 1–1c, 1936. (Host: *Cryturellus soui inconspicuus.*)

I have now been able to examine a large series of specimens of this interesting species taken on five races of *Crypturellus soui*, *C. obsoletus punensis*, and *C. u. undulatus*. In my previous report (1936) I placed all specimens taken up to that time (except those from *C. s. soui*) under the nominate form. Additional material, together with more careful study, shows that some of these must be given subspecific rank, especially those from *C. obsoletus punensis*, of which there is a large series from numerous individual hosts taken in Peru and Bolivia. The whole series is very uniform and presents characters that may not be disregarded. The single male from *Nothocercus nigrocapillus*, previously listed under *platycephalus* has been discarded, since I am convinced that it was not its true host, having become accidently mixed with that material in some unknown manner.

Specimens from *C. soui ochraceiventris*, *C. s. meserythrus*, and *C. s. mustelinus* are all so very close to the type series that they must remain there, while two males and a female from *C. u. undulatus* are so close that to separate them would savor too much of hair-splitting. The male genitalia in these specimens from *C. u. undulates* are exactly like those of *platycephalus*, except slightly smaller, but of the same proportions, although the paramers may be a trifle slenderer, as well as the endomeral plate, but the body and head measurements are so close to *platycephalus* that practically all the differences easily fall within the range of individual variation. It was previously stated that a scent gland was present on the fifth abdominal segment in the male (Carriker, 1936, p. 123), but no description or figure was given. The fifth pleurite is incised on the posterior portion of the inner margin to receive it. The gland is elongated globular in shape, with a tubular outlet on the inner face (see figure). This gland differs slightly in size and shape in the different races of *platycephalus*.

HEPTAPSOGASTER PLATYCEPHALUS ASYMMETRICUS, new subspecies

FIGURE 17, *a*, *c*

Types.—Male and female, adults, from *Crypturellus obsoletus punensis*, collected by the author at Samaipata, Bolivia, November 2, 1937; in collection of author.

Diagnosis.—In general appearance this race is very similar to *H. p. platycephalus*, with the same markings on head and body and same chaetotaxy, having (in the male) one hair and one spine on the posterior margin of pleurite II; the same on III; one spine and two hairs on IV; and three hairs on V. The seventh abdominal segment is not circular on posterior margin but has lateral margins straighter and sinuated, while the chaetotaxy is slightly different (see fig.).

The insect is much larger than *platycephalus* in most body dimensions, except that the male genitalia have the endomeral plate slightly shorter and wider. The proportions of the head are also different, while the prothorax and mesothorax are actually shorter and the metathorax narrower; the abdomen is much longer (1.06 against 0.95) but scarcely wider (0.70 against 0.68). The most striking differences are found in the male genital armature. The paramers are much longer (0.14 against 0.11) and very much slenderer, with the base differently shaped; the single endomeral plate presents a character heretofore not seen by the author. It lies *on top* of the basal plate and paramers (not unusual), but on its left side, at posterior portion, is a curious appendage, joined to the plate at the base of the penis. This character is uniform in all males taken from this host, regardless of locality. I cannot conceive what may be the function of this appendage. In *H. p. soui* the male genitalia are of the same pattern as in *platycephalus*, but the paramers are much shorter and the endomeral plate differently shaped.

HEPTAPSOGASTER TESSELATUS ORNATUS, new subspecies

FIGURE 17, *d–f*

Types.—Male and female, adults, from *Nothoprocta o. ornata*, collected by the author at Callipampa, Bolivia, June 14, 1936; in collection of author.

Diagnosis.—Nearest to *H. t. truncatus* Carriker, having the male genital armature very similar to that form; the incrassations on the paratergal plates are more pronounced and of a type different from *truncatus*. The head in the male is very much narrower at the temples than in *tesselatus* or *truncatus*, being almost the same shape as in the female of *tesselatus;* the pleural plates are more deeply pigmented, and the prothorax has the sides less convex than in the above-

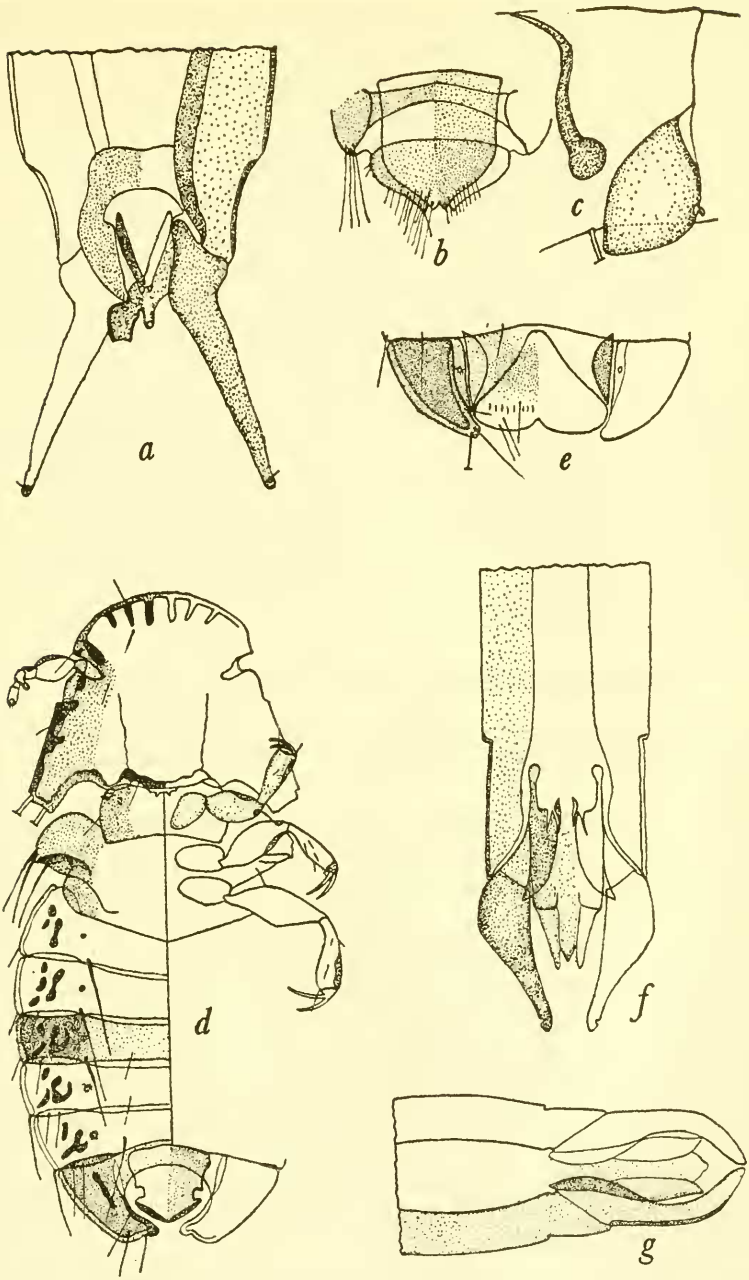

FIGURE 17.—HEPTAPSOGASTER and RHYNCOTHURA

a–c, *Heptapsogaster platycephalus asymmetricus*, new subspecies: *a*, Male genitalia; *b*, tip of female abdomen; *c*, scent gland.

d–f, *H. tesselatus ornatus*, new subspecies: *d*, Body of male; *e*, tip of female abdomen; *f*, male genitalia.

g, *Rhyncothura minuta boliviana*, new subspecies: Male genitalia.

mentioned races; the tergal and paratergal plates are also closely fused, with the suture almost invisible, as in *truncatus*. There is some variation in the markings on the pleural plates, but I think that this may be due to the age of the specimens, the fully adult individuals having the incrassations more fully developed.

MEASUREMENTS OF HEPTAPSOGASTER TESSELATUS

Structure	*ornatus*				*pentlandi*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.49	-------	1.58	-------	1.41	-------	1.58	
Head: frons	-------	0.38	-------	0.44	-------	0.355	-------	0.42
Head: temples	0.466	0.59	0.50	0.595	0.41	0.58	0.41	0.62
Head: occiput	0.41	-------	0.44	-------	0.358	-------	0.456	
Prothorax	0.12	0.28	0.13	0.30	0.13	0.28	0.135	0.326
Mesothorax	0.17	0.586	0.195	0.60	0.20	0.586	0.24	0.63
Metathorax	0.15	0.44	0.15	0.456	0.155	0.44	0.17	0.48
Abdomen	0.86	0.72	0.92	0.78	0.82	0.716	0.94	0.805
Antennae	0.195	0.054	0.174	0.038	0.228	0.054	0.174	0.034
Paramers	0.076	0.095	-------	-------	0.087	0.105	-------	
Endomeral plate	0.098	0.035	-------	-------	0.108	0.035	-------	

HEPTAPSOGASTER TESSELATUS PENTLANDI, new subspecies

Types.—Male and female, adults, from *Nothoprocta p. pentlandi*, collected by the author at Choros, Bolivia, January 10, 1937; in collection of author.

Diagnosis.—This race is more or less intermediate between *tesselatus* and *ornatus*, having the shape of the head in the male as in the former, but with the genitalia of the latter, although with some differences in proportion, the paramers being slightly longer but of exactly the same width at the thickened basal portion, but they are set much farther apart, and so a pronounced open space remains between each paramer and the endomeral plate. The endomeral plate is of the same width as in *ornatus*, but slightly longer.

The head is considerably smaller in all dimensions than in *ornatus*, except the width at temples, which is almost the same. The prothorax and mesothorax are longer than in *ornatus* but of the same width, while the metathorax is exactly the same; the abdomen is shorter, but of the same width, while the antenna in the male is longer, but first segment of equal width.

There are also considerable discrepancies in the measurements between the female and that of *ornatus* (see table of measurements). The incrassations on the pleural plates are almost identical with those of *ornatus*.

Genus RHYNCOTHURA Carriker

RHYNCOTHURA MINUTA BOLIVIANA, new subspecies

FIGURES 17, *g*; 18, *a*, *b*

Types.—Male and female, adults, from *Nothura maculosa oruro*, collected by the author at Callipampa, Bolivia, May 31, 1936; in collection of author.

Diagnosis.—The male differs from *R. minuta minuta* in shape of head, shape and proportion of thoracic segments, shape of abdomen, and character of abdominal sclerites, as well as in the shape and proportion of the genital armature.

The preantennal area is considerably longer, with frons rounded instead of flatly convex and with margin not crenulated; the sides of the prothorax are straight to the posterior angles, not convex, while both mesothorax and metathorax are of different shape.

The abdomen is slenderer, less rounded, but with chaetotaxy about the same, except that most of the hairs are longer. There is no hyaline space between the tergites and pleurites, these sclerites being closely fused, with the suture very faintly visible, while the tergal plates are broken medially and sternal plates continuous. (The first joint of the antennae of the male, as shown in the figure, is the inside face; the opposite face is much narrower, 0.06 instead of 0.078.)

MEASUREMENTS OF RHYNCOTHURA MINUTA BOLIVIANA

Structure	Male		Female	
	Length	Width	Length	Width
Body	1.21		1.36	
Head: frons		0.30		0.33
Head: temples	0.39	0.415	0.41	0.436
Head: occiput	0.375		0.40	
Prothorax	0.09	0.217	0.108	0.23
Mesothorax	0.14	0.35	0.15	0.37
Metathorax	0.13	0.31	0.11	0.33
Abdomen	0.67	0.52	0.80	0.52
Antennae	0.195	0.05	0.16	0.033
Paramers	0.09	0.06		
Endomeral plate	0.087	0.038		

The female is very similar to the male, the head, except for the dimorphic antennae, being similar as to markings and shape, although slightly longer, but of same width at temples. The abdomen is elongated, with segments VI and VII wide, the latter being flatly rounded posteriorly. The pleural plates are narrower and have inner margin clearly outlined. There seems to be a clear space between the sternal plates and the pleurites, while the latter are continuous with the

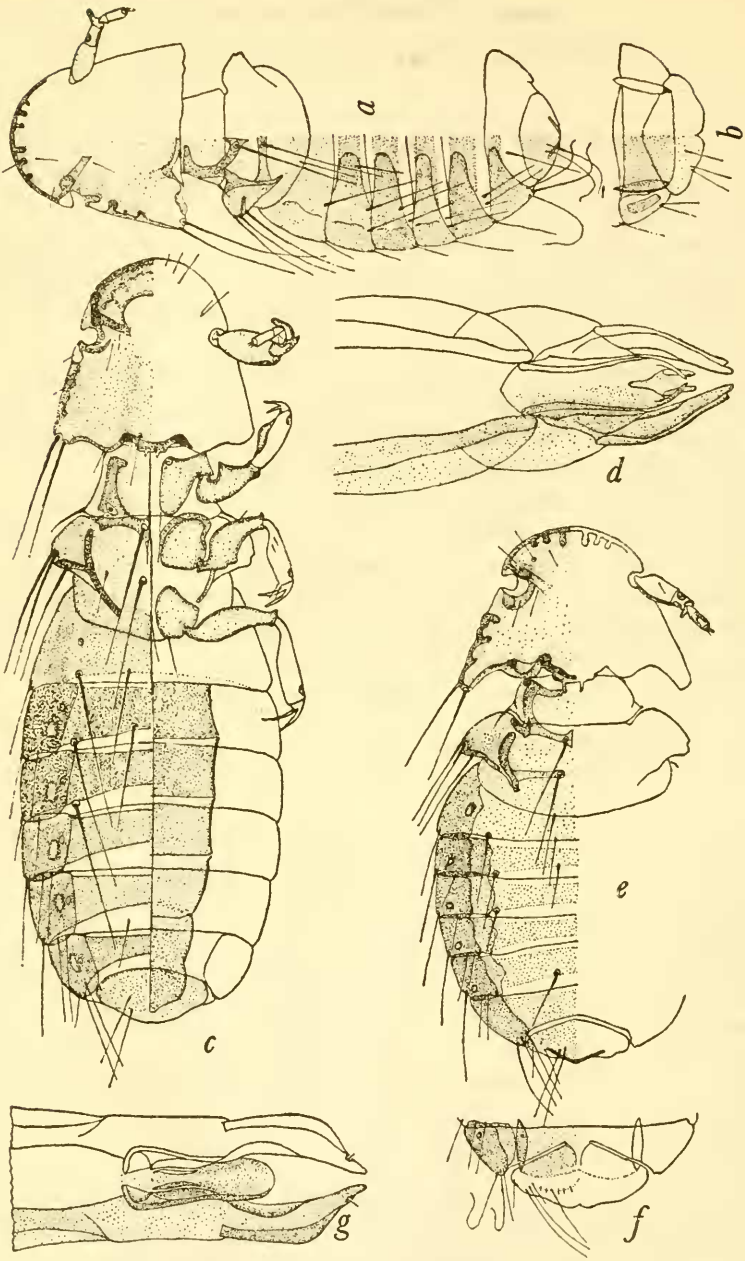

FIGURE 18.—RHYNCOTHURA

a, *b*, *Rhynocothura minuta boliviana*, new subspecies: *a*, Body of male; *b*, tip of female abdomen.

c, *d*, *R. heterura*, new species: *c*, Body of male; *d*, male genitalia.

e–*g*, *R. chacoensis*, new species: *e*, Body of male; *f*, tip of female abdomen; *g*, male genitalia.

tergals. The head of the female is longer than in *minutus*, while there is but slight trace of the dark band along the temporal margins; segments VI and VII of the abdomen are both wider than in *R. m. minuta*, with the latter evenly rounded posteriorly, while the genital plate is of different shape.

RHYNCOTHURA HETERURA, new species

FIGURE 18, *c*, *d*

Type.—Male, adult, from *Nothoprocta cinerascens*, collected by the author at Villa Montes, Bolivia, November 6, 1936; in collection of author.

Diagnosis.—This species closely resembles *R. testudo* (Clay), from *Nothura maculosa peruviana*, and may prove to be conspecific with it, but until actual comparison can be made I prefer to keep it as a distinct species. The measurements are exceedingly close, as far as given by Clay, but the prothorax is more divergent, with the sides concave, while the sides of the mesothorax are shorter and strongly rounded (in *testudo*, according to the microphotograph published, the sides of both prothorax and mesothorax are straight). The chaetotaxy of the abdomen seems to be about the same. The genital armature of *heterura* certainly is different from that of *testudo* (according to the figure by Clay), while abdominal segment VII is entire, not bilobed on the dorsal surface as in *testudo*.

The pleural plates are wide and faintly outlined on their inner side but clearly fused with the tergites, which are continuous across the abdomen, and with both sclerites deeply pigmented. The sternal plates are prominent, considerably wider (longitudinally) than the tergites, but are rather widely separated from the paratergals, and with a sharp, deeply pigmented line bordering their outer edges in segments II to VI.

The shape of the coxae and that of the femora in this species are most extraordinary, but it is not possible to tell from the microphotograph of *testudo* whether or not they are the same in that species. The first and second coxae and femora are especially noteworthy, having shapes I have not hitherto seen (see figure). The species is represented by 4 males, the female not having been taken.

Measurements for this species are given under *R. subteres*, which follows.

RHYNCOTHURA SUBTERES, new species

FIGURE 19, *a–c*

Types.—Male and female, adults, from *Nothoprocta p. pentlandi*, collected by the author at Incachaca, Bolivia, June 1937; in collection of author.

Diagnosis.—This species is undoubtedly close to *R. teres* Clay, from *Nothura maculosa peruviana* and *Nothoprocta p. pericardia*, and may possibly prove to be conspecific with it.

It differs from *teres* in the following particulars: The length of body is less in both sexes, while the head in the male is slightly longer but much narrower, and in the female both slightly *shorter* and *much* narrower; the prothorax is noticeably shorter and narrower in both sexes, while the mesothorax is much narrower and the abdomen shorter.

It is impossible to compare the measurements of the genitalia, since those for *teres* are not given. In *teres* the abdominal tergites are continuous in segments I, VI, and VII and separated in II to V, but in *subteres* they are continuous in *all* abdominal segments, but not strongly chitinized or deeply pigmented, and are so closely fused with the pleurites that the suture is completely lost, while the pigmentation of the latter sclerites is but little deeper than in the tergites. The markings on the pleurites may be seen clearly in the accompanying figure. The chaetotaxy of the abdomen is quite different. In *teres* there are two hairs at posterolateral angle of segment VI, instead of one; there is a longish hair at the inner posterior corner of the pleurites of segments I to V, with two more in the median portion of the posterior margin of pleurite IV; there are two hairs on the median portion of the posterior margin of tergal plates I to V, while on segment VII there are three long and one short hairs on each side of posterior margin (the two long ones submarginal).

MEASUREMENTS OF RHYNCOTHURA

Structure	*heterura* (male)		*subteres*			
			Male		Female	
	Length	Width	Length	Width	Length	Width
Body	1.68		1.59		2.04	
Head: frons		0.366		0.35		0.43
Head: temples	0.41	0.445	0.48	0.586	0.52	0.56
Head: occiput	0.42		0.45		0.52	
Prothorax	0.15	0.305	0.12	0.305	0.14	0.347
Mesothorax	0.15	0.456	0.175	0.51	0.24	0.59
Metathorax	0.17	0.37	0.16	0.41	0.195	0.48
Abdomen	0.96	0.58	0.90	0.69	1.24	0.84
Antennae	0.26	0.082	0.25	0.083	0.217	0.045
Paramers	0.065	0.064	0.10	0.08		
Endomeral plate	0.073	0.023	0.098	0.043		

As in *teres*, the female of *subteres* is considerably larger than the male in all its dimensions except the filiform antenna, which is shorter. The head is also differently shaped from the male, the postantennal margins being straight in the male and concave in the fe-

male, and with temples narrower in the female than in the male (just the reverse of *teres*, which is typical of the sexual dimorphism found in this and other groups with temples of this type).

RHYNCOTHURA CHACOENSIS, new species

FIGURE 18, *e–g*

Types.—Male and female, adults, from *Nothoprocta cinerascens*, collected by the author at Villa Montes, Bolivia, November 6, 1936; in collection of author.

Diagnosis.—In this distinct species we have a type of head similar to that of *Heptapsogaster tesselatus*, with the six internal projections on the frons and the heavy templar incrassations, but there is no sign of the tessellated dorsal surface, the serrated margins of the occiput and mesothorax, or the peculiar structure of abdominal segment VII found in that species, while the type of the genitalia is quite distinct.

The whole insect is small, about the size of *R. minuta*, with the head large and body short and wide. The prothorax is short and wide, with convex, divergent sides and sharp lateral angles with a spine; the structure of the mesometathoracic segments is clearly illustrated in the figure, as well as the chaetotaxy.

The abdomen in both sexes is oval, short, and broad and but little longer than wide (0.69 by 0.63 and 0.70 by 0.62). The structure of the paratergals is somewhat obscure. In the male they seem to be clearly outlined on the inner margins but with another sclerite showing within the pleurites on segments II to VI. This may be a ventral extension of the pleurite, more faintly pigmented than the dorsal portion, and with irregular internal margin. There is a small, more deeply pigmented, round or oval spot on pleurites I to V. These are not the spiracles, which are located in the paler, inner portion of the plate. The tergites are continuous, but narrow and faintly pigmented, and there are no apparent sternites.

The chaetotaxy of the whole body is scanty (see figure). The legs are small, with femora and tibiae short and thick and of about equal length and with some stout, longish spines, but not so many as in *subteres*. The trochanters are also well developed on all three legs, while the claws are long and very slender. The male genitalia are simple in structure, the short, thick paramers, sharply bent inward apically and tapering to their narrow tips; the endomeral plate is deeply inserted within the basal plate and is almost as long as the paramers, with broad, rounded tip, destitute of projections of any kind. Like so many species of this genus, there is a minute bristle set in a small pit on the outer edge of the paramers near their tips.

The head and body of the female are very similar to those of the male, except for the dimorphic antennae; the incrassations along the

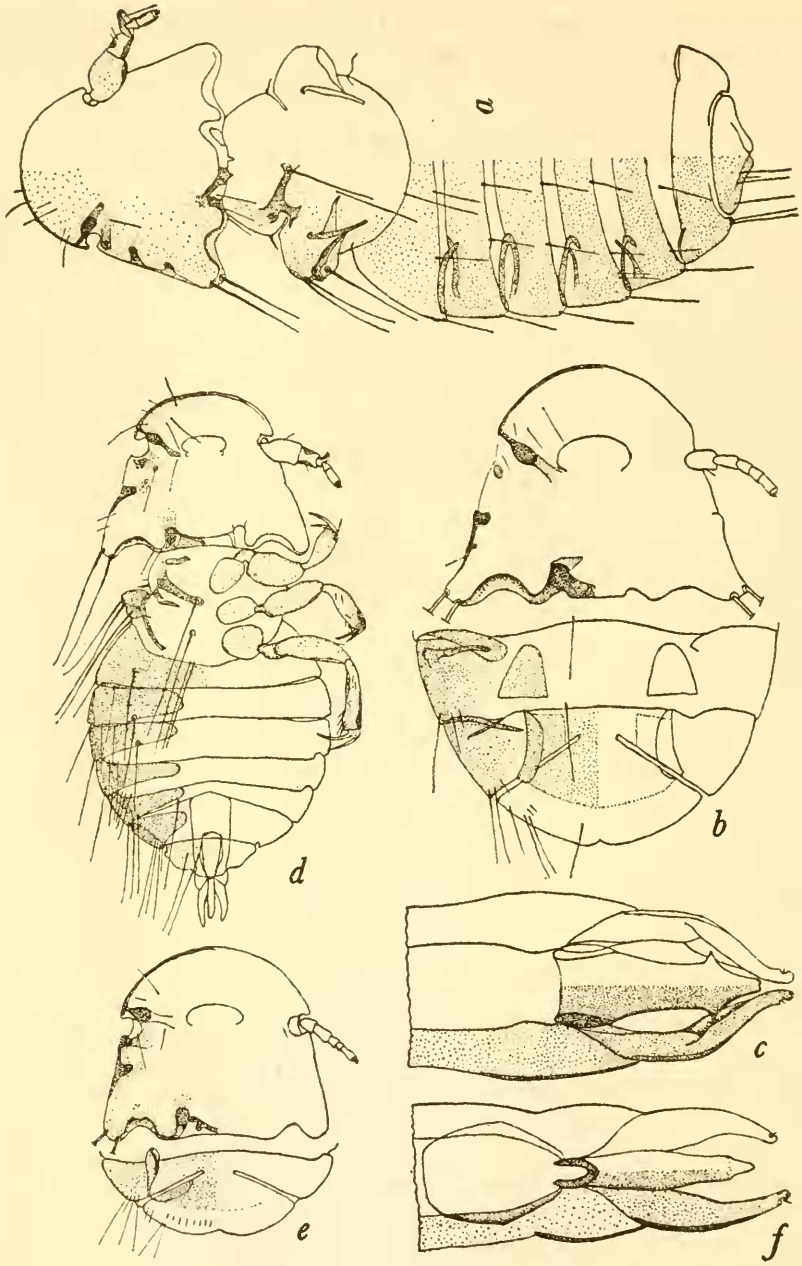

FIGURE 19.—RHYNCOTHURA

a–c, *Rhyncothura subteres*, new species: *a*, Body of male; *b*, head and tip of female abdomen; *c* male genitalia.

d–f, *R. andinae*, new species: *d*, Body of male; *e*, female head and tip of abdomen; *f*, male genitalia.

temples and frons are slightly larger and the templar margins slightly more sinuate; the abdominal sclerites and markings are similar, while the chaetotaxy is exactly the same except on segment VII (see figure). Measurements are given with those of *R. andinae*.

RHYNCOTHURA ANDINAE, new species

FIGURE 19, *d–f*

Types.—Male and female, adults, from *Tinamotis pentlandi*, collected by the author at Potosí, Bolivia, January 23, 1938; in collection of author.

Diagnosis.—This is the smallest species of the genus now known and decidedly different from all others in many characters. Like *teres* and *subteres* it has no internal projections on the frons and very few markings on the head and thorax and none at all on the abdomen. The head is very large, much larger than the combined thoracic segments, while the abdomen in both sexes is very small. The thoracic structure is also unique. The three segments are very closely fused, even the prothorax and mesothorax, where the suture is extremely difficult to distinguish, especially in the male. The suture between the mesothorax and metathorax is also very short (at sides only) and almost invisible. The sexes are strongly dimorphic, not only in the antennae, but in the shape of the head (see figure).

MEASUREMENTS OF RHYNCOTHURA

Structure	*chacoensis*				*andinae*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.20		1.21		1.06		1.26	
Head: frons		0.314		0.347		0.30		0.41
Head: temples	0.38	0.53	0.39	0.51	0.36	0.45	0.40	0.49
Head: occiput	0.365		0.36		0.336		0.40	
Prothorax	0.11	0.30	0.12	0.27	0.11	0.25	0.09	0.25
Mesothorax	0.18	0.50	0.19	0.49	0.20	0.365	0.215	0.38
Metathorax	0.13	0.44	0.13	0.39				
Abdomen	0.69	0.63	0.70	0.62	0.57	0.52	0.69	0.55
Antennae	0.206	0.055	0.16	0.038	0.195	0.06	0.155	0.03
Paramers	0.078	0.07			0.105	0.055	0.108	0.02
Endomeral plate	0.076	0.038						

The genital armature of the male is also somewhat unusual in its extreme simplicity, the endomeral plate being long and slender, without lateral thickened bars or rods, and with only a horseshoe-shaped support at its base. The basal plate presents an unusual character, in that the inner margin of the lateral bands seems to be folded back (see fig.). All four males taken show this character.

The chaetotaxy of the whole body is typical of the genus, presenting no unusual features (see fig.). The legs are of normal shape, although the femora are somewhat unusual, the first pair being short and very thick, while the other two pairs are elongated and of rather abnormal shape; the trochanter is large in the first and third legs, small in the second. The tergal plates are widely separated medially and closely fused with the paratergals, while the sternal sclerites are apparently wanting. The abdomen in the female, except for greater length and difference in terminal segment, is the same as in the male.

RHYNCOTHURA TESTUDO (Clay)

Heptapsogaster testudo CLAY, Proc. Zool. Soc. London, ser. B. 1937, p. 140, figs. 2a, 3b, 3c, 4d, pl. 1, fig. 5. (Host: *Nothura maculosa peruviana*, Peru.)

This species is unquestionably not a *Heptapsogaster* but a typical *Rhyncothura*. As stated in the introduction, true *Heptapsogaster* is not found on any of the Tinamidae inhabiting the grasslands (note species of questionable status), while *Rhyncothura* is confined to that group (*Tinamotis*, *Nothoprocta*, *Nothura*, and *Rhynchotes*). Also, the genus *Rhyncothura*, as defined by the author, places no obstacle for the inclusion of *testudo* in it, while *Heptapsogaster* certainly does.

Genus TRICHODOPEOSTUS Carriker

TRICHODOPEOSTUS SPINOSUS PRAEGRACILIS, new subspecies

Types.—Male and female, adults, from *Nothocercus bonaparti*, collected by the author at Tierra Nueva, Sierra Perijá, Colombia, July 16, 1941; in U. S. National museum.

Diagnosis.—The characters separating this race from typical *spinosus* are not conspicuous, but are constant, and may be briefly summed up as follows:

The whole insect, as well as most of its component parts, is uniformly smaller; the proportions of the head vary considerably between the races and the sexes of the same race, the length in the male being less, with width at temples less, but at the frons practically the same. In female the length at the occiput is equal, slightly less at the temples, while the width at the temples is *much more*, with the frons the same (frons: 0.54 against 0.55; temples: 0.92 against 0.80). The thoracic segments are both shorter and narrower in both sexes, but there is little difference in width of abdomen (length of abdomen not always a reliable measurement). The antennae in the male are longer and narrower (first segment), and in the female slightly longer but of equal width.

Perhaps the most noticeable difference is in the male genitalia, which have the basal plate longer and narrower (0.44 by 0.11 against 0.38 by

0.12), while the combined paramers are also longer and *much narrower* (0.326 by 0.0162 against 0.38 by 0.0108).

A series of 27 males and 10 females was taken from three individuals of the type host at Tierra Nueva and Monte Elias, Sierra Perijá, Colombia, and one male and two females on the same host from La Cumbre de Valencia, Venezuela. They are very uniform in size, markings, and chaetotaxy, with the exception of the number of spines along the posterior margins of the pleurite, which varies considerably in the two pleurites of the same segment (a case similiar to the number of teeth in the abdominal combs of *Rhopaloceras*), there often being *one* less on the *right* side of the abdomen. It is a curious coincidence that the lesser number of spines should almost invariably be on the right side. It is not a case of a spine having been broken off, since when that happens the place of attachment is always clearly visible. This phenomenon is also present in the series of *T. s. spinosus*.

MEASUREMENTS OF TRICHODOPEOSTUS SPINOSUS

Structure	*spinosus*				*praegracilis*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.71		1.96		1.71		2.05	
Head: frons		0.54		0.55		0.53		0.54
Head: temples	0.59	0.825	0.63	0.80	0.55	0.77	0.61	0.92
Head: occiput	0.50		0.50		0.477		0.50	
Prothorax	0.20	0.42	0.206	0.43	0.185	0.41	0.195	0.41
Mesothorax	0.25	0.68	0.26	0.69	0.24	0.66	0.25	0.66
Metathorax	0.25	0.586	0.25	0.61	0.22	0.56	0.24	0.57
Abdomen	0.98	0.80	1.13	0.82	1.00	0.78	1.33	0.79
Antennae	0.26	0.095	0.25	0.05	0.29	0.087	0.27	0.05
Basal plate	0.38	0.12			0.44	0.11		
Paramers	0.326	0.0162			0.38	0.0108		

HETEROPEOSTUS, new genus

Genotype.—Rhyncothura carrikeri Clay.

Diagnosis.—Superficially resembling some species of *Rhyncothura* but differing from that genus in the structure and markings of the abdominal sclerites and especially in the male genitalia, which seem to be of a completely unique type and of generic significance in this family.

Size medium; sexual dimorphism in shape of antennae, head, abdomen, and seventh abdominal segment. First antennal segment in male lengthened and swollen; second segment enlarged to a lesser degree; third with distal end elongated, and the minute fourth at-

tached on the side; fifth normal. Female with antennae filiform, with first, second, and fifth segments subequal, fourth the shortest.

Head large, in female larger than combined thoracic segments; frons flatly rounded to circular; temples expanded laterally, with rounded angles, and extending little if any behind the occiput. Prothorax short and wide; mesothorax and metathorax almost completely fused, the latter overlapping the former at the sides and being almost entirely imbedded within the first abdominal segment. Pharyngeal sclerite and gland well developed.

Abdomen elliptical in female, almost parallel-sided in the male from segment I to IV; tergal plates entire and broadly separated from the paratergals, which are of a most unusual shape (see figure); sternal plates also entire, and extending completely across the abdomen, under the pleural plates; tip of segment VII with large opening for extruding of genitalia, on the dorsal side of which there is a heavily chitinized, circular margin. Legs small, rather stout, with tibiae and femora about equal in length; coxae small, but trochanters well developed; claws long and slender.

Chaetotaxy somewhat sparse, especially on body, but most hairs are long.

Genital armature with basal plate extremly long and wide (resembling *Rhopaloceras*), extending from tip of abdomen to posterior coxae; paramers minute, completely fused to tip of basal plate, and with their tips bent sharply inward. The endomeres seem to consist of a long sac lying on top of a wide, median slit in the basal plate and are attached to the basal plate at the anterior end of the slot. The portion lying over the basal plate is strengthened by a heavily chitinized longitudinal bar on each side, while the portion of the sac which fills the space between the minute paramers is unpigmented, nonchitinized, and with thin membranous walls.

HETEROPEOSTUS CARRIKERI (Clay)

FIGURE 29, *c–f*

Rhyncothura carrikeri Clay, Proc. Zool. Soc. London, ser. B, 1937, p. 143, fig. 6c, pl. 2, figs. 1, 2. (Host: *Nothoprocta cinerascens*.)

I have a series of 6 males and 13 females of this interesting species, taken on the type host, collected by myself at Villa Montes, Bolivian Chaco, November 6, 1936.

On the same individual host with the above series of *H. carrikeri* were taken two new species of typical *Rhyncothura*. This fact, considered in connection with the strikingly different genitalia and abdominal structure of *H. carrikeri*, has convinced me that *carrikeri* should be placed in a new genus.

I have two males with the genital armature half extruded, both in splendid condition for study. In the drawing published by Miss Clay the paramers are shown as jointed to the basal plate. This is an error, as can be plainly seen in my material, since they are completely fused with the basal plate, the only evidence of point of fusion being the thickening of the margins in the paramers. Her figure of the endomeral sac is also somewhat misleading, since it is distorted, being pulled to the left. In my material there are two males that show this distortion, the remaining being normal, as in the figure herewith presented.

Genus HEPTARTHROGASTER Carriker

HEPTARTHROGASTER MINUTUS (Carriker)

FIGURE 20, *g*

Goniodes minutus CARRIKER, Univ. Nebraska Stud., vol. 3, No. 2, p. 155, pl. 4, figs. 1, 2, 1903. (Host: *Tinamus robustus=T. major castaneiceps.*)
Heptarthrogaster minutus (Carriker) CARRIKER, Lice of the tinamous, p. 135, pl. 20, figs. 2–2b, 1936. (Host: *Tinamus major castaneiceps.*)

This genus seems to be rare. Since the publication of the "Lice of the Tinamous," 1936, I have been able to secure the following additional material of this species: Two females from *Tinamus s. serratus*, Bolivia; one male and two females from *T. serratus ruficeps*, Colombia; one male from *Crypturellus garleppi affinis*, Bolivia (which may possibly belong to *T. s. serratus*), and a series of 24 males and females from *Tinamus major percautus*, Mexico. There are certain minute differences between the specimens from *T. s. serratus*, *T. s. ruficeps*, and *T. major castaneiceps* (the type series), but these are so small that it does not seem advisable to separate them, especially in view of the small amount of material available for study. However, the series from *T. major percautus* seems worthy of subspecific rank and is described below.

HEPTARTHROGASTER MINUTUS MEXICANUS, new subspecies

FIGURE 20, *h*

Types.—Male and female, adults, from *Tinamus major percautus*, collected by the author at Cerro Tuxtla, Veracruz, Mexico, March 23, 1940; in the U. S. National Museum.

This race agrees rather closely with *H. m. minutus* in many respects. There is a noticeable difference in the shape of the head in the male, as well as in the shape and proportions of the genital armature. They are also slightly larger in all respects, and so it seems advisable to recognize this form.

MEASUREMENTS OF HEPTARTHROGASTER MINUTUS

Structure	*minutus*				*mexicanus*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	0.91	-------	1.11	-------	1.08	-------	1.20	
Head	0.29	0.36	0.26	0.41	0.30	0.38	0.27	0.43
Prothorax	0.14	0.28	0.14	0.30	0.14	0.29	0.14	0.30
Mesothorax	-------	0.39	-------	0.40	-------	0.41	-------	0.43
Abdomen	0.56	0.53	0.69	0.55	0.59	0.54	0.76	0.58

HEPTARTHROGASTER PARVULUS (Taschenberg)

FIGURE 20, *d*

Goniodes parvulus TASCHENBERG. Die Mallophagen, p. 38, pl. 1, figs. 4–4b, 1882. (Host: *Tinamus robustus*, Costa Rica=*T. major castaneiceps.*)

Heptarthrogaster parvulus (Taschenberg) CARRIKER. Lice of the tinamous, p. 134, pl. 20, figs. 1–1b, 1936. (Host: *Tinamus major castaneiceps.*)

The types of this species were taken on a dried skin of "*Tinamus robustus*," from Costa Rica, according to Taschenberg. At that time the Caribbean and Pacific races of *Tinamus major* had not been separated, and all were known as *T. robustus*, which name is now restricted to the birds from Mexico and Guatemala. Therefore, it is not possible to say (without knowing the exact locality from which Taschenberg's host came) which race of *T. major* is the true host of this parasite, since collecting had been done on both sides of the country by the three Germans von Frantzius, Hoffmann, and Ellendorf, who began working in Costa Rica about 1858, and whose collections went to Berlin. They were notorious for the inaccuracy of the locality data on their skins, many being labeled "San Jose" that obviously could not possibly have come from there, and so we shall probably always be in some doubt about this point.

The only Costa Rican specimens I have seen of this parasite are two females taken on *Tinamus major castaneiceps* from Pozo Azul (on the Pacific side), and their measurements agree very closely with those given by Taschenberg.

Additional material has been secured from the following hosts: *Tinamus serratus ruficeps*, Venezuela and Colombia; *Tinamus major percautus*, Mexico; and *Tinamus t. tao*, Colombia. These specimens have been carefully measured, together with those from *T. s. serratus* and the two females from Costa Rica. This series falls into two groups, the larger specimens coming from *Tinamus t. tao* and *T. major percautus*, the latter being slightly larger than the former; the smallest specimens are from *T. s. ruficeps*, with those from *T. s. ser-*

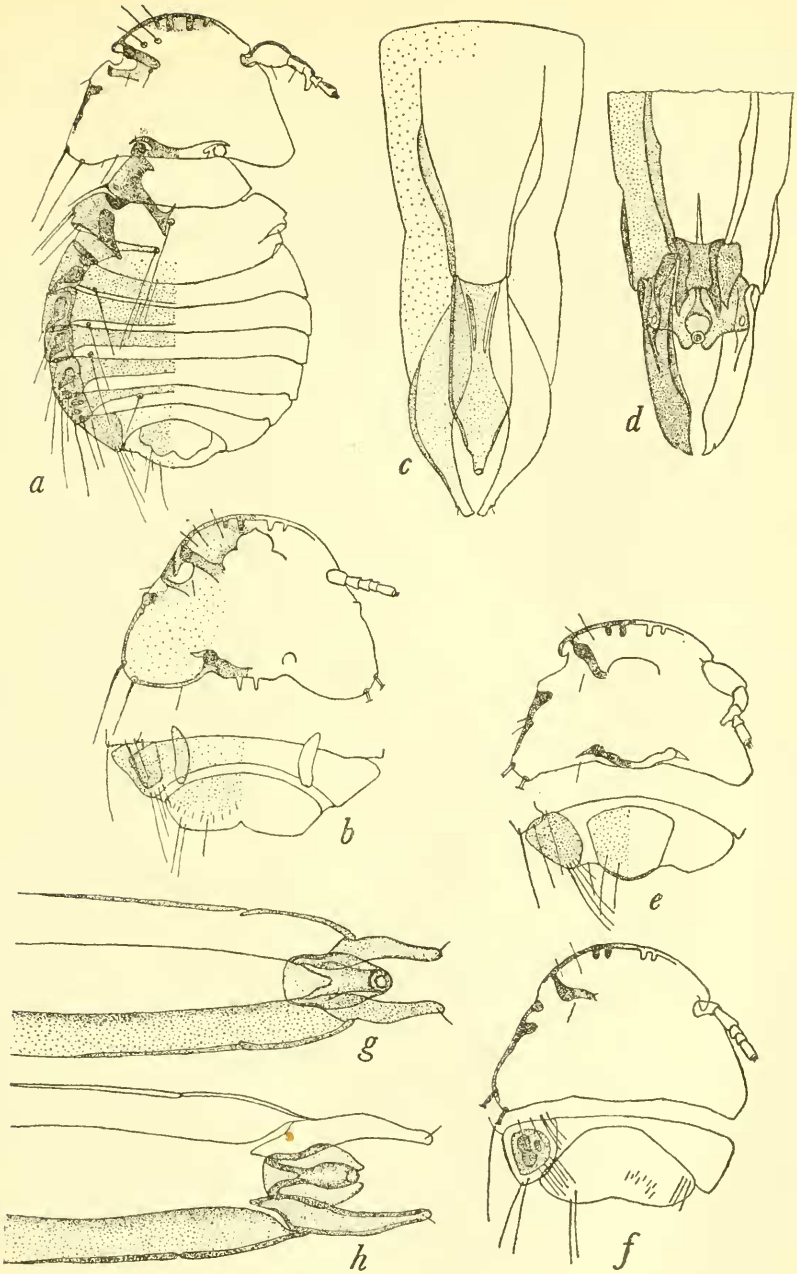

FIGURE 20.—HEPTARTHROGASTER

a–c, *Heptarthrogaster latacephalus*, new species: *a*, Body of male; *b*, female head and tip of abdomen; *c*, male genitalia.

d, *H. parvulus* (Taschenberg): *d*, Male genitalia.

e, *f*, *H. costaricensis*, new species: *e*, Male head and tip of abdomen; *f*, female head and tip of abdomen.

g, *H. minutus minutus* (Carriker): Male genitalia.

h, *H. m. mexicanus*, new subspecies: Male genitalia.

ratus being but a trifle larger. The typical female from Costa Rica is almost exactly the same size as the females from *T. s. serratus*.

The male genitalia, while presenting certain minute differences, are very uniform as to proportions, with the slight variations in size corresponding to the size of the insect. To attempt to separate these insects into different races of *parvulus* would be pure hair-splitting and serve no useful purpose.

This species and *H. minutus* seem to be among the most stable of the tinamou lice, having remained almost identical while their hosts have undergone considerable differentiation, especially *T. t. tao*.

MEASUREMENTS OF HEPTARTHROGASTER PARVULUS FROM FIVE TINAMOU HOSTS

Structure	From *Tinamus major castaneiceps* (female)		From *T. m. percautus*				From *T. tao tao*			
			Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.18									
Head frons	0.304	0.444	0.326	0.30	0.35	0.36	0.326	0.285	0.345	0.337
Head temples				0.395		0.52		0.37		0.49
Prothorax	0.14	0.30	0.145	0.32	0.15	0.33	0.14	0.33	0.15	0.326
Mesothorax	0.13	0.444	0.13	0.50	0.12	0.52	0.12	0.475	0.13	0.49
Metathorax	0.14	0.40	0.15	0.456	0.15	0.44	0.15	0.42	0.16	0.45
Abdomen	0.67	0.54	0.61	0.60	0.73	0.65	0.59	0.565	0.73	0.63
Antennae	0.18		0.24	0.065	0.18	0.033	0.217	0.07	0.18	0.033
Paramers			0.108	0.067			0.12	0.072		
Endomeral plate			0.058	0.04			0.06	0.03		

Structure	From *T. serratus serratus*				From *T. s. ruficeps*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.05		1.19		1.03		1.12	
Head frons	0.30	0.28	0.324	0.33	0.30	0.28	0.326	0.33
Head temples		0.35		0.44		0.38		0.44
Prothorax	0.13	0.29	0.14	0.32	0.15	0.326	0.13	0.293
Mesothorax	0.108	0.43	0.12	0.44	0.11	0.445	0.108	0.456
Metathorax	0.13	0.40	0.14	0.40	0.13	0.40	0.144	0.41
Abdomen	0.564	0.53	0.65	0.54	0.51	0.565	0.64	0.57
Antennae	0.217	0.06	0.174	0.033	0.206	0.055		
Paramers	0.10	0.065			0.098	0.065		
Endomeral plate	0.054	0.033			0.05	0.035		

HEPTARTHROGASTER LATACEPHALUS, new species

FIGURE 20, *a-c*

Types.—Male and female, adults, from *Crypturellus u. undulatus*, collected by the author at Boca Chaparé, Bolivia, August 25, 1937: in collection of author.

Diagnosis.—Very different from the known species of this genus and may be distinguished by the much wider temples in the males, the short, rounded abdomen in both sexes (wider than long in the male), and the style of markings on the paratergal plates.

There are but four internal projections on the antennal band in both sexes (six in *parvulus* and *minutus*); the prothorax is large, much wider than long and with sides more divergent than the other species; the mesometathoracic segments are very similar to those of *parvulus*. The abdomen is almost circular in both sexes, with pleural plates sharply delineated and tergites entire, but separated by pronounced hyaline areas; pleurites I to V with darker, internal incrassations; segment VII rounded anteriorly and posteriorly (angulated anteriorly in all other forms). The chaetotaxy is sparse and similar in the sexes, except that in the female there are two hairs on the posterior margin of pleurites II and III and three on IV and V, while the hairs on the mesosternal and metasternal plates and tergites I to III are slenderer and some shorter.

The male genitalia have the paramers somewhat like those in *minutus*, except for their attachment to the basal plate, while the endomeral plate resembles that of *parvulus*, except for greater length; the basal plate is very short.

The female is considerably larger than the male, with filiform antennae and with well-developed, pointed processes extending backward under the first segment of the antennae, which are attached on the *ventral* side of the head, the first segment being nearly covered by the dorsal integument. Abdominal segment VII is broad and short, with rounded sides, flattened posterior margin and medium emargination, and with rounded anterior margin (not angulated as in the other species). The genital plates consist of two semicrescent-shaped sclerites lying across each side of tergite VI, extending over V and touching edge of VII. Scent gland entirely absent.

MEASUREMENTS OF HEPTARTHROGASTER LATACEPHALUS

Structure	Male		Female	
	Length	Width	Length	Width
Body	0.95		1.19	
Head	0.326	0.28	0.38	0.35
frons		0.51		0.575
temples				
Prothorax	0.11	0.31	0.10	0.35
Mesothorax	0.12	0.47	0.15	0.54
Metathorax	0.11	0.456	0.15	0.52
Abdomen	0.48	0.586	0.67	0.716
Antennae	0.22	0.06	0.16	0.032
Paramers	0.072	0.072		
Endomeral plate	0.098	0.033		

HEPTARTHROGASTER COSTARICENSIS, new species

FIGURE 20, *e*, *f*

Types.—Male and female, adults, from *Crypturellus soui modestus*, collected by the author at Guapiles, Costa Rica, on March 10, 1903; in collection of author.

Diagnosis.—Differs from *latacephalus* as follows: Slightly larger in size, head wider at frons in both sexes, while in the female the temples are of same width or slightly less, with length of head also slightly less; posterior margin of temples *straight* in both sexes (not rounded) and in the male the points are more attenuated and less rounded; tubercles at base of antennae in the female are shorter and less pointed; thoracic segments of slightly different porportions. The structure of the abdominal plates is practically the same as in *latacephalus*, but the abdomen in the female is also wider than long (longer than wide in *latacephalus*). The chaetotaxy seems to be very similar in both sexes but differs considerably from that of *latacephalus* (see fig.).

The male genitalia are somewhat different, especially the endomeral plate (see fig.); the paramers are shorter, but of same width, while the endomeral plate is both shorter and narrower, and has the tip broad and truncated, with what seems to be a small penis.

Remarks.—This species is of the general type of *latacephalus*, although the head of the male in some respects resembles that of *parvulus*, except for shape of occipital margin. Species represented by two males and one female, including the types.

The taking of this new type of *Heptarthrogaster* on two species of *Crypturellus* so far removed from each other, both geographically and systematically, presents further proof of the stability of the species of this genus. It is probable that the *minutus* and *parvulus* group are confined to the avian genus *Tinamus* and the *latacephalus* and *costaricensis* group to *Crypturellus*.

MEASUREMENTS OF HEPTARTHROGASTER COSTARICENSIS

Structure	Male		Female	
	Length	Width	Length	Width
Body	1.07		1.29	
Head frons	0.35	0.337	0.37	0.38
Head temples		0.53		0.56
Prothorax	0.11	0.35	0.12	0.36
Mesothorax	0.14	0.52	0.15	0.56
Metathorax	0.13	0.49	0.16	0.53
Abdomen	0.57	0.655	0.75	0.78
Antennae	0.23	0.065	0.16	0.04
Paramors	0.062	0.075		
Endomeral plate	0.076	0.025		

HEPTARTHROGASTER GRANDIS Carriker

FIGURE 21, *a–d*

Heptarthrogaster grandis CARRIKER, Lice of the tinamous, p. 136, pl. 20, fig. 3, 1936. (Host: *Tinamus s. serratus.*)

This species was described from a single female and was placed in *Heptarthrogaster* with some misgivings, since the male was unknown. I now have two males and five females of what seems to all appearances to be the same species but collected on *Tinamus t. tao*, in the Sierra Perijá of Colombia. The measurements of the type (after correction) prove to be extremely close to the females taken on *T. t. tao* (see table of measurements), while I can find no differences in shape of body segments or chaetotaxy in the females.

Under these conditions it seems advisable to label these specimens from *Tinamus t. tao* as *H. grandis* and describe the male as such. If the males from *T. s. serratus* should prove to be distinct from the male here described as *grandis*, then the insects from *Tinamus tao* will be without a name, but I doubt very much if they will prove to be different, since the females are apparently identical.

Description of male: The antennae are strongly dimorphic, the first segment being much lengthened and thickened; the second is short, but thick, while the third has a medium-sized hook at the distal end, much less developed than in either *minutus* or *parvulus*.

There is little difference in the shape of the head in the sexes, the frons being slightly more flattened in the male, with the trabecular tubercles somewhat larger, as well as the internal projections on the frons. There are no differences between the sexes in the markings of the head and thorax, but the prothorax is smaller in the male.

The abdomen is shorter and narrower than that of the female and more ovoid; the pleural plates are wider and lack the small hooks at the inner posterior corner on segments II to V; the shape of the incrassations on the pleural plates also differs slightly between the sexes, the hook at the posterior end of the marking being more open and with the end lengthened horizontally in the male.

In the female the sternal plates of the abdomen are continuous across the abdomen but very faintly pigmented, while the tergites are separated from both the pleural plates and from each other medially (the published figure of the female does not show the faintly pigmented sternites).

In the male the tergites are closely joined to the pleural plates and almost touch each other medially but are much more widely separated horizontally by hyaline spaces than in the female. Segments VI and VII are shorter in the male, VI having the tergal plate continuous, while VII is flatly rounded both anteriorly and posteriorly and protrudes but slightly beyond segment VI.

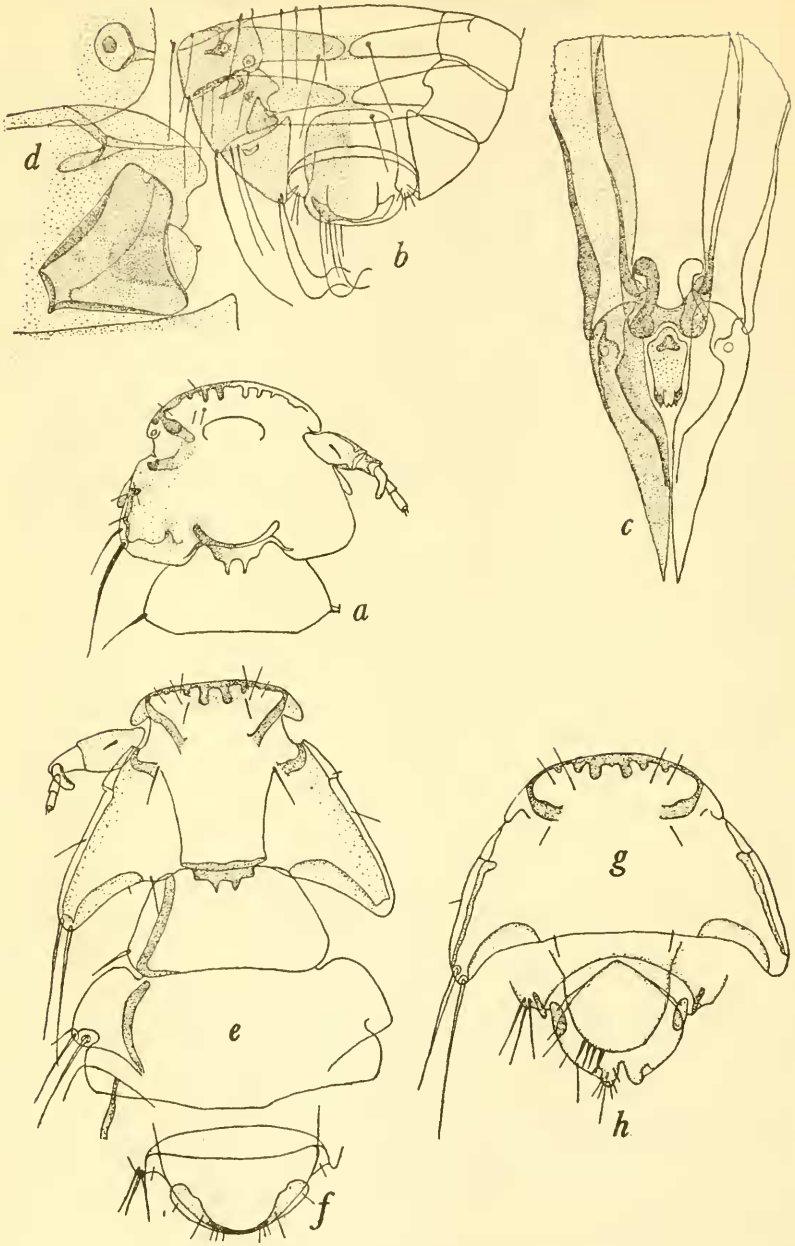

FIGURE 21.—HEPTARTHROGASTER and MEGAPEOSTUS

a–d, *Heptarthrogaster grandis* Carriker: *a*, Male head; *b*, tip of female abdomen; *c*, male genitalia; *d*, scent gland.

e–h, *Megapeostus multiplex multiplex* Clay: *e*, Male head and thorax; *f*, male abdominal segment VII; *g*, female head; *h*, female abdominal segment VII.

The scent glands in this species are unique. On segment IV the gland is small, round, with dark granulated center, and resembles that of *Heptapsogaster temporalis*, while it seems to lie between the dorsal and ventral integument, near the inner, posterior edge of the sclerite, which is *not* incised to receive it. The gland on segment V is entirely different. It is more than half as wide as the pleurite and extends posteriorly slightly under segment VI. Apparently it consists of two parts, a large triangular body attached to the ventral surface of the pleurite and a second part attached to the median portion of the first part and extending nearly over to its inner edge, where the pleurite is incised back to the large triangular body on its posterior portion. The visible portion of this second part of the gland is ovoid, unpigmented, and with a short median outlet, so that it resembles a woman's breast. This is undoubtedly the sac where the substance secreted is stored, while the large, deeply pigmented portion is where it is secreted. The large triangular body has the sides (in part) raised, or folded over, which leads one to assume that it is attached to the ventral surface and not between the two integuments, and apparently does not have its entire surface attached to the pleurite.

The genital armature is of the same general type as *H. minutus*, with small, weak endomeres, but with the paramers longer and with straight tips tapering to a point.

MEASUREMENTS OF HEPTARTHROGASTER GRANDIS FROM TWO TINAMOU HOSTS

Structure	From *Tinamus s. serratus*		From *Tinamus t. tao*			
	Female (type) (corrected)		Male		Female	
	Length	Width	Length	Width	Length	Width
Body	1.73		1.46		1.78	
Head frons	0.43	0.63	0.40	0.39	0.41	0.46
Head temples				0.53		0.63
Prothorax	0.206	0.42	0.18	0.41	0.218	0.456
Mesothorax	0.16	0.64	0.16	0.63	0.16	0.67
Metathorax	0.227	0.58	0.24	0.586	0.24	0.63
Abdomen	1.06	0.82	0.82	0.89	1.07	0.846
Antennae	0.25		.29	0.072	0.25	0.045
Paramers	0.15	0.076				
Endomeral plate	0.087	0.043				

Genus MEGAPEOSTUS Carriker

MEGAPEOSTUS PARVIGENITALIS Carriker

Megapeostus asymmetricus parvigenitalis Carriker, Lice of the tinamous, p. 143, pl. 23, fig. 2, 1936. (Host: *Crypturellus atrocapillus*, Bolivia.)

Owing to the discovery of several new species belonging to this unusually interesting genus, additional information has come to light

concerning the characters that separate the species belonging to it. In view of this information it has seemed advisable to give the race *parvigenitalis* full specific rank, as well as the subspecies *M. multiplex secundus* Clay. The host of this species was wrongly identified. It should be *Crypturellus garleppi affinis.*

MEGAPEOSTUS MULTIPLEX MULTIPLEX Clay

FIGURES 21, *e–h;* 22, *a*

Megapeostus multiplex multiplex CLAY, Proc. Zool. Soc. London, ser. B, 1937, p. 150, figs. 9c, 10a, pl. 3, fig. 2. (Host: *Crypturellus b. boucardi,* Nicaragua.)

The original description and figures given by Miss Clay for this and the following species are not very complete and have been supplemented by further remarks and additional figures.

A series of 38 adults of both sexes was taken on four individuals of the type host, collected by the author on Cerro Tuxtla, Veracruz, Mexico, in March 1940.

The male of *M. multiplex* is very similiar in general appearance to the male of *M. parvigenitalis*, with which it agrees in the absence of hooks on the posterior margin of the metathorax, shape of the head, and in having *four* deeply pigmented, internal projections from the narrow clypeal band, on the front of the head, instead of *two*, as in *asymmetricus.*

In the male the body measurements are all slightly less than in *parvigenitalis*, with the single exception of the width of the abdomen, which is greater. However, the genital armature is quite different. The basal plate is larger than in *parvigenitalis;* the paramers are *equal* in length, but both are bent to the *right*, apically, and are very unequal in shape (see fig.); the endomeral plate with attached penis (?) resembles somewhat that of *parvigenitalis*, except that it is much longer and tapers to a narrow, *bifurcated* tip, each bifurcation being clearly tubular in character. In addition, there is a long, slender hook attached at each side of the basal plate, outside of the paramers, which curves inward and backward under the paramers. These hooks are also asymmetrical.

The female differs from that of *parvigenitalis* in having the temples longer, narrower, and more pointed (like the female of *asymmetricus*), but the head is narrower (proportionately) across the temples than either of these two species, and the temples are less divergent. As to size, the female of *multiplex* presents a most unusual situation. It is not only much smaller than the female of *parvigenitalis* but is also smaller than its own male sex, in every measurement. The last abdominal segment is also differently shaped from either of the described species (*asymmetricus* and *parvigenitalis*).

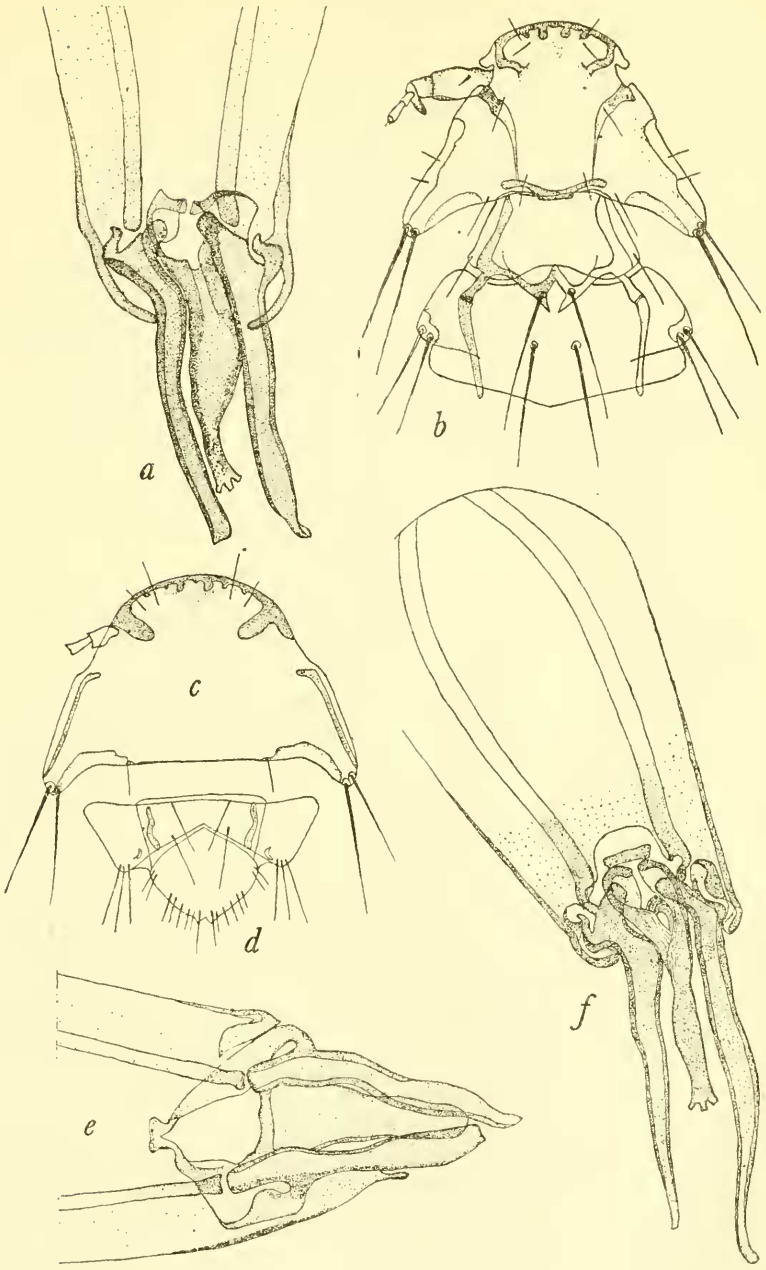

FIGURE 22.—MEGAPEOSTUS

a, *Megapeostus multiplex multiplex* Clay: Male genitalia.
b–e, *M. secundus* Clay: *b*, Male head and thorax; *c*, female head; *d*, tip of female abdomen; *e*, male genitalia.
f, *M. multiplex idoneus*, new subspecies: Male genitalia.

MEASUREMENTS OF MEGAPEOSTUS

Structure	*parvigenitalis* (corrected)				*m. multiplex*			
	Male		Female		Male		Females (average of 5)	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	2.10	.....	2.40	.....	2.07	.....	1.98	
Head	0.54	0.835	0.57	0.868	0.51	0.76	0.487	0.75
Prothorax	0.27	0.49	0.26	0.44	0.24	0.466	0.22	0.415
Mesothorax	0.195	0.76	0.195	0.738	0.18	0.735	0.16	0.68
Metathorax	0.217	0.69	0.24	0.68	0.217	0.67	0.21	0.64
Abdomen	1.25	0.84	1.35	0.88	1.31	0.81	1.28	0.80
Antennae	0.39	0.09	0.26	0.03	0.30	0.09	0.21	0.038
Basal plate	0.41	0.25	.....	.....	0.456	0.31	.....	
Long paramer	0.347	0.04	.....	.....	[1]0.292	0.028	.....	
Short paramer	0.26	0.024	.....	.....	[2]0.282	0.021	.....	
Endomeral plate	0.184	0.017	.....	.....	0.217	0.043	.....	

[1] Right. [2] Left.

MEGAPEOSTUS MULTIPLEX IDONEUS, new subspecies

FIGURE 23, *a–c*

Types.—Male and female, adults, from *Crypturellus idoneus*, collected by the author at Carraipia, La Guajira, Colombia, May 30, 1941; in U. S. National Museum.

Diagnosis.—Differs from *M. m. multiplex* Clay in the following characters: Male with frons more convex, between *multiplex* and *secundus*, and with six instead of four internal projections on the front; the sides of the temples are almost straight (less convex than in *multiplex*); the prothorax is nearer to the shape of *secundus*, as well as the metathorax; abdominal segment VII is also different (see fig.), as well as the shape of the incrassations on the pleural plates; the scent gland,[7] on pleurite V, is strongly developed in both forms, but the pleurite is more deeply incised for its reception in *idoneus*.

The male genitalia are of the same pattern as in *multiplex*, in that they possess the curving braces attached at the base of the basal plate, for the support of the paramers; the endomeral plate is likewise of the same type, with tripartite tip. The longer paramer (the *right*) is of a different pattern, however, being similar in shape to the long *left* paramer in *M. asymmetricus* Carriker, but most of the component parts of the genital armature differ considerably in detail from those of *multiplex*.

The female is very close to that of *multiplex*. The temples are wider

[7] The scent gland is well developed in all the species of this genus I have seen (*M. asymmetricus, M. parvigenitalis, M. multiplex, M. m. idoneus,* and *M. secundus*) and is of the same type in all the species, with a short tubular outlet at its apex, much resembling a woman's breast. The different species and subspecies present certain slight differences in size, shape, and the incised recess in which it lies.

at their tips, while abdominal segment VII differs both in structure and chaetotaxy (see fig.). The single female of *secundus* I have seen has this segment as shown in the figure, but I am of the opinion that this specimen is slightly immature and that perhaps the fully adult will show differences in structure.

The species is represented in the collection by four males and two females, two pairs from one bird and two males from another.

Miss Clay (1937, p. 151) had a single female of this species, taken from a skin of the type host, which she placed, without remark, under *M. secundus*, the types of which were taken on *Crypturellus cinnamomeus mexicanus*.

This is the third species of Mallophaga taken on the Colombian host *Crypturellus idoneus*, which is very closely related to the parasites from *C. b. boucardi* of Mexico and not to *C. c. cinnamomeus* or *C. cinnamomeus sallaei*. This cumulative evidence seems to show that *C. idoneus* of Colombia is conspecific with *C. boucardi* and not with *C. cinnamomeus*, as given by Peters.

MEASUREMENTS OF MEGAPEOSTUS MULTIPLEX IDONEUS

Structure	Male		Female	
	Length	Width	Length	Width
Body	2.00		1.95	
Head: frons		0.38		0.47
Head: temples	0.51	0.79	0.52	0.80
Head: occiput	0.44		0.44	
Prothorax	0.22	0.45	0.215	0.41
Mesothorax	0.18	0.70	0.174	0.67
Metathorax	0.18	0.65	0.18	0.63
Abdomen	1.22	0.81	1.17	0.78
Antennae	0.30	0.10	0.23	0.04
Basal plate	0.53	0.326		
Long paramer	0.43	0.18		
Short paramer	0.37			
Endomeral plate	0.30	0.11		

MEGAPEOSTUS SECUNDUS Clay

FIGURE 22, *b–e*

Megapeostus multiplex secundus CLAY, Proc. Zool. Soc. London, ser. B, 1937, p. 150, figs. 9b, 10b. (Host: *Crypturellus cinnamomeus mexicanus*, Mexico.)

Two males and one female were taken on *Crypturellus cinnamomeus sallaei*, collected by the author at Tres Zapotes, Veracruz, Mexico, on March 27, 1940.

Male: The head is very similar to that of *multiplex* in every particular except that the length from the occiput to the front is slightly less, and from the front to the tips of the temples slightly more, while the temples are narrower. Also, the metathorax is without hooks on

the posterior margin, and the suture separating it from the abdomen is *entire*, as in *multiplex* and *parvigenitalis*, only *asymmetricus* having this suture interrupted medially, as shown in the figure of that species (Carriker, 1936, pl. 28, fig. 1). The abdomen appears to be about the same, including the apical segment.

The measurements, as compared with *multiplex*, are curiously variable. The body is shorter; the head is shorter but wider; the prothorax is both shorter and narrower; the mesothorax of the same length, but considerably narrower; the metathorax both shorter and narrower; and the abdomen shorter but of the same width.

The genital armature is, however, very different from all three of the known species, being asymmetrical to a most surprising degree. The *left* paramer is the shorter, is much constricted medially, then widens apically and ends in a truncated tip. The right paramer is of more or less uniform width, but much twisted, and ends in an outcurving, narrow tip.

The endomeral plate is rather similar in general shape to that of *multiplex*, but less tapering apically, and terminates in a *broadly rounded tip, with no sign of penis or tubular outlet.*

A projection of the basal plate extends backward along the left paramer for two-thirds of its length, ending in a point, while there is attached on the outside of each paramer, near the base, a curiously shaped, elongated flap, which folds back under the distal portion of the basal plate, the two flaps being joined medially. The whole genital apparatus, both for this species and *multiplex*, is among the most unbelievably bizarre and extraordinary that have come under my notice. The single female taken is very similar to that of *multiplex* and, like that species, is slightly smaller than the male in some of but not all its measurements.

MEASUREMENTS OF MEGAPEOSTUS SECUNDUS

Structure	Male		Female	
	Length	Width	Length	Width
Body	1.93		1.93	
Head	0.49	0.77	0.51	0.77
Prothorax	0.227	0.434	0.217	0.41
Mesothorax	0.184	0.69	0.16	0.67
Metathorax	0.195	0.64	0.217	0.62
Abdomen	1.19	0.80	1.15	0.80
Antennae	0.33	0.09	0.227	0.043
Basal plate	0.456	0.26		
Right paramer	0.292	0.033		
Left paramer	0.26	0.043		
Endomeral plate	0.25	0.065		

Genus DISCOCORPUS Carriker

DISCOCORPUS CEPHALOSUS FURCULUS, new subspecies

FIGURE 23, *d–f*

Types.—Male and female, adults, from *Crypturellus b. boucardi*, collected by the author on Cerro Tuxtla, Veracruz, Mexico, March 28, 1940; in collection of author.

This form presents a combination of the characters of both *cephalosus* and *microgenitalis*, the head being somewhat similar in shape to the latter, yet different from either, while the genital armature is of the same type as the former.

In the male the body length, as well as the length and breadth of the head, is greater than in *cephalosus;* the prothorax is shorter and wider; the mesothorax is both longer and wider, while the metathorax is shorter and wider; the abdomen is also longer and wider and the antennae longer.

Both paramers and basal plate are longer, but scarcely wider.

In the female of *furculus* the prothorax is shorter, the mesothorax and abdomen the same length, while all the other measurements are greater. The last abdominal segment is considerably wider but about the same length, while the chaetotaxy is very similar.

The genital armature is decidedly the type of *cephalosus*, both as to size and structure of basal plate, paramers, and endomeral plate, differing only in their proportions (see corrected figure of *cephalosus* and of *furculus*). However, the seminal duct is quite different, that of *cephalosus* being a simple tube, with two complete convolutions, and with the distal opening at the end of the endomeral plate. In *furculus* the duct is without convolutions, although there is a thickening of the tube in the middle portion, which may or may not be a sort

MEASUREMENTS OF DISCOCORPUS CEPHALOSUS

Structure	*cephalosus*				*furculus*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	0.87	-------	1.04	-------	1.02	-------	1.10	
Head	0.26	0.47	0.29	0.50	0.31	0.55	0.32	0.55
Prothorax	0.087	0.29	0.092	0.30	0.07	0.326	0.087	0.347
Mesothorax	0.087	0.466	0.108	0.46	0.10	0.52	0.108	0.52
Metathorax	0.13	0.42	0.13	0.41	0.12	0.50	0.15	0.53
Abdomen	0.55	0.65	0.65	0.67	0.57	0.72	0.66	0.75
Antennae	0.15	-------	0.16	-------	0.18	-------	0.195	
Paramers	0.087	0.07	-------	-------	0.097	0.072	-------	
Basal plate	0.17	0.065	-------	-------	0.195	0.065	-------	

of valve, beyond which point the duct becomes smaller, with very thin, almost transparent walls. At the tip of the endomeral plate the duct divides into two branches, which extend a short distance beyond it.

A careful study of the figures accompanying this article, as well as the original description of *cephalosus* and *microgenitalis*, will prove more enlightening than a detailed description. The original drawing for the male genitalia of *cephalosus* proves to be erroneous, and a corrected one is herewith given (fig. 23, *g*).

DISCOCORPUS CEPHALOSUS INTERMEDIUS, new subspecies

FIGURE 23, *h, i*

Types.—Male and female, adults, from *Crypturellus idoneus*, collected by the author at El Bosque, Sierra Perijá, Colombia, on June 14, 1941; in U. S. National Museum.

Diagnosis.—This race is closer to the nominate form than to *furculus*. It differs from *cephalosus* as follows: The preantennal portion of the head is practically the same, as to shape and width, but the temples are less convex laterally, and they extend farther posteriorly on each side of prothorax. There are minute differences in shape, size, and proportions of the various body segments which are too slight to enumerate, the chief distinguishing character of the race being the male genitalia (see fig.), which differ considerably from both *cephalosus* and *furculus*. The endomeral plate is of the type of *cephalosus*, but much wider posteriorly and of distinct shape, while the seminal duct is more like that of *furculus*, except that it is *not* bipartite. The paramers and basal plate also present differences. There is no trace of a scent gland in this genus.

MEASUREMENTS OF DISCOCORPUS CEPHALOSUS INTERMEDIUS

Structure	Male		Female	
	Length	Width	Length	Width
Body	0.95		0.97	
Head: frons	0.26	0.33	0.26	0.337
Head: temples		0.51		0.515
Prothorax	0.08	0.315	0.07	0.30
Mesothorax	0.12	0.50	0.13	0.48
Metathorax	0.17	0.44	0.15	0.43
Abdomen	0.60	0.71	0.59	0.65
Antennae	0.15	0.04	0.16	0.03
Basal plate	0.205	0.085		
Paramers	0.087	0.07		
Endomeral plate	0.06	0.03		

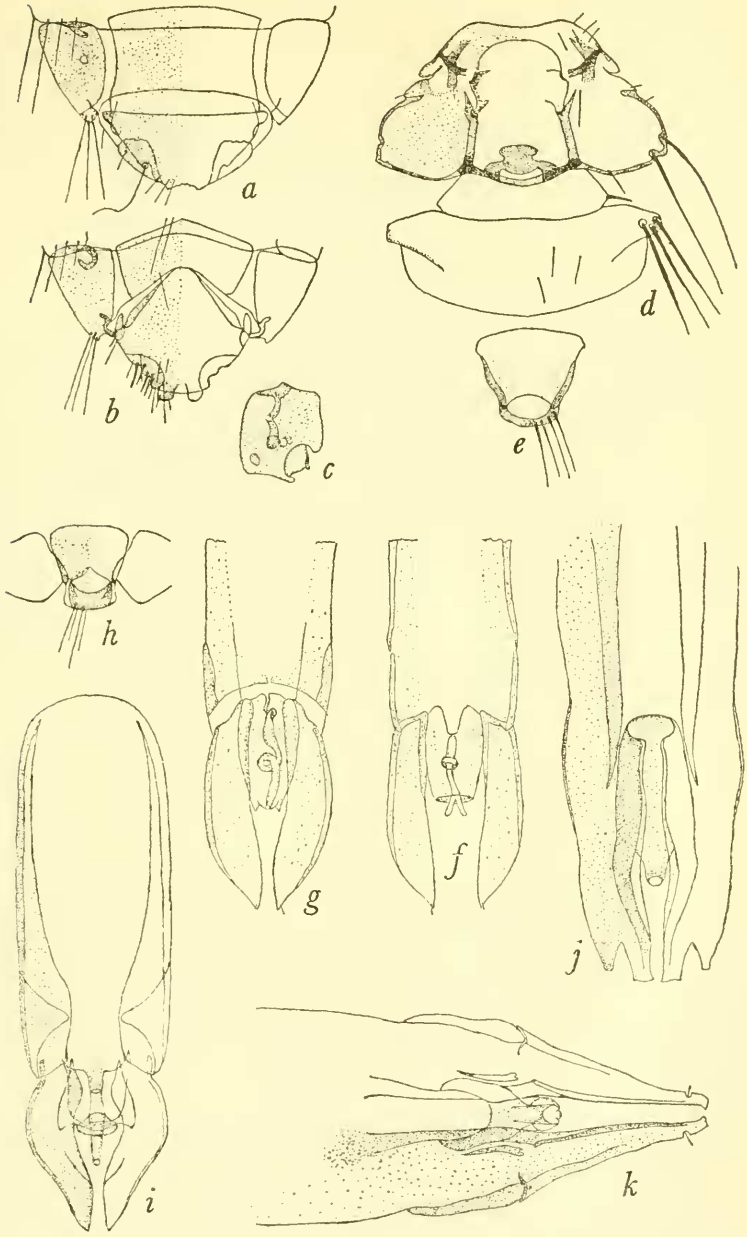

FIGURE 23.—MEGAPEOSTUS, DISCOCORPUS, and HEPTAPSUS

a–c, *Megapeostus multiplex idoneus*, new subspecies: *a*, Tip of male abdomen; *b*, tip of female abdomen; *c*, pleurite V with scent gland.

d–f, *Discocorpus cephalosus furculus*, new subspecies: *d*, Male head and thorax; *e*, male abdominal segment VII; *f*, male genitalia.

g, *D. cephalosus cephalosus* Carriker: Male genitalia.

h, *i*, *D. c. intermedius*, new subspecies: *h*, Male abdominal segment VII; *i*, male genitalia.

j, *Heptapsus nothocercae* Carriker: Male genitalia.

k, *H. inexpectatus*, new species: Male genitalia.

The female, except for shape of head, seems to be indistinguishable from the female of *cephalosus*. The species is represented by four males and four females, the type series of three pairs from one bird, the other pair from another, taken at Carraipia, La Guajira, Colombia.

Note.—The drawing of *D. cephalosus* published in 1936 (pl. 24, fig. 1) shows the front of the head too convex. There is actually a slight depression in the middle of the *frons*, but much less than in *D. microgenitalis*.

Genus LAMPROCORPUS Carriker

LAMPROCORPUS HIRSUTUS Carriker

Lamprocorpus hirsutus Carriker, Lice of the tinamous, p. 150, pl. 25, figs. 1–1e, 1936. (Host: *Nothoprocta branickii.*)

I have a large series of this handsome species taken on several individuals of *Nothoprocta o. ornata*, collected at Callipampa, Incachaca, Choros, and Potosí, Bolivia. There seems to be no valid grounds for separating these insects from *hirsutus*, they being extremely similar in all respects, except the single character of more, and more prominent, internal projections on the frons. However, since this character, I find, is subject to individual variation, it does not seem sufficient for their separation.

Genus HEPTAPSUS Carriker

HEPTAPSUS NOTHOCERCAE Carriker

Figure 23, *j*

Heptapsus nothocercae Carriker, Lice of the tinamous, p. 154, pl. 27, figs. 1–1b, 1936. (Host: *Nothocercus bonaparti.*)

This species was described from two males and one female, all in rather poor condition. I have recently secured fresh material from the type host, taken in northern Colombia. The published figure of the male genitalia is somewhat misleading, and a corrected one is herewith presented.

The chaetotaxy, as shown in the published figure of the male, is very deficient, and we have the following additions: Four short, dorsal hairs on the frons, two marginal and two submarginal; two ventral hairs on each side of head just forward of antennal bands; a dorsal hair on each side of base of mandibles; two submarginal hairs on middle of temples instead of one; a long hair on posterior margins of abdominal segments II to V near the small hair shown in the figure; an additional hair on segments IV and V on the posterior margin, inside the lateral angle; two median ventral hairs also on segments III and IV; four dorsal hairs on median portion of posterior margin of

segments I to III. The chaetotaxy of the female is practically the same as in the male, with the exception of segment VII.

I was much surprised to find among these specimens of *Heptapsus* a second species which is larger than *nothocercae* and which has the male genitalia quite different. Both species were taken together on two individuals of the same host. It is described below.

HEPTAPSUS INEXPECTATUS, new species

FIGURE 23, *k*

Types.—Male and female, adults, from *Nothocercus bonaparti*, collected by the author at Tierra Nueva, Sierra Perijá, Colombia, July 12, 1941; in U. S. National Museum.

Diagnosis.—Differs from *H. nothocercae* as follows: Total length considerably more in both sexes (male, 1.32 against 1.18; female, 1.45 against 1.16); the head in the male is longer but very little wider, either at frons or temples, while in the female it is about the same proportion but larger; the thoracic segments are of practically the same length in both sexes but uniformly wider (than in *nothocercae*), while the abdomen is both longer and wider in both sexes. In the female of *nothocercae* the anterior margin of abdominal segment V is slightly concave, and that of VI is straight, while in the new form both V and VI are strongly arched, being pushed forward medially by the longer segment VII. The structure of segment VII in the female is also slightly different (see fig.). The chaetotaxy seems to be about the same in both species.

The most striking difference is in the male genitalia. In *nothocercae* the paramers are so completely fused with the basal plate that they seem to be merely a continuation of it, no trace of suture being visible. In *inexpectatus* the paramers, while strongly fused to the basal plate, nevertheless clearly show the line of suture on the sides, while they are short, straight, and tapering to a narrow, truncated tip (not broad and bifurcated as in *nothocercae*). The endomeral plate is small, poorly chitinized and pigmented, and difficult to differentiate. The species is represented by two males and five females, while in the same lot of specimens were four males and six females of *H. nothocercae*.

Remarks.—These two species (*H. nothocercae* and *H. inexpectatus*) are remarkably alike superficially. The females, except for size and different shape of abdominal segments V and VI, would be impossible to differentiate. The males are even more similar than the females, except for genitalia and proportions of head.

MEASUREMENTS OF HEPTAPSUS

Structure	*nothocercae*				*inexpectatus*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.18		1.16		1.32		1.45	
Head: frons		0.28		0.37		0.295		0.42
Head: temples	0.37	0.53	0.44	0.54	0.456	0.545	0.50	0.62
Head: occiput	0.29		0.35		0.347		0.37	
Prothorax	0.13	0.35	0.14	0.37	0.14	0.38	0.14	0.38
Mesothorax	0.11	0.45	0.13	0.48	0.12	0.51	0.14	0.59
Metathorax	0.11	0.37	0.13	0.41	0.11	0.43	0.13	0.45
Abdomen	0.65	0.50	0.76	0.57	0.75	0.54	0.87	0.65
Antennae	0.26	0.07	0.195	0.026	0.26	0.075	0.22	0.032
Paramers	[1]	0.098			0.18	0.108		
Endomeres	[1]	[1]			0.075	0.043		

[1] Paramers are fused to basal plate, suture invisible; structure of endomeral plate very obscure.

Genus PTEROCOTES Ewing

PTEROCOTES ABERRANS MEXICANUS, new subspecies

FIGURE 24, *a–c*

Types.—Male and female, adults, from *Tinamus major percautus*, collected by the author on Cerro Tuxtla, Veracruz, Mexico, March 23, 1940; in U. S. National Museum.

The Mexican form of this species is more closely related to *P. a. aberrans* of Costa Rica than to *P. taoi* of Peru, differing from the latter in much larger size, less tapering tip to abdomen, shape of abdominal segment VII, and the genitalia.

MEASUREMENTS OF PTEROCOTES ABERRANS

Structure	*aberrans* (types)				*mexicanus*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.93		2.32		2.00		2.34	
Head: frons		0.336		0.52		0.36		0.50
Head: sides		0.30				0.32		
Head: temples	0.56	0.69	0.61	0.87	0.56	0.66	0.61	0.80
Head: occiput	0.41		0.45		0.43		0.44	
Prothorax	0.24	0.50	0.24	0.53	0.21	0.48	0.23	0.52
Mesothorax	0.17	0.65	0.17	0.69	0.15	0.63	0.16	0.67
Metathorax	0.14	0.54	0.13	0.61	0.13	0.53	0.13	0.58
Abdomen	1.17	0.68	1.54	0.76	1.23	0.69	1.59	0.76
Basal plate	0.37	0.20			0.45	0.22		
Paramers	0.28	0.07			0.35	0.10		
Endomeral plate	0.29	0.045			0.28	0.045		
Genitalia			0.43	0.13			0.43	0.11
Antennae			0.28	0.045			0.29	0.045
Antennae, first segment	0.24	0.13			0.24	0.135		

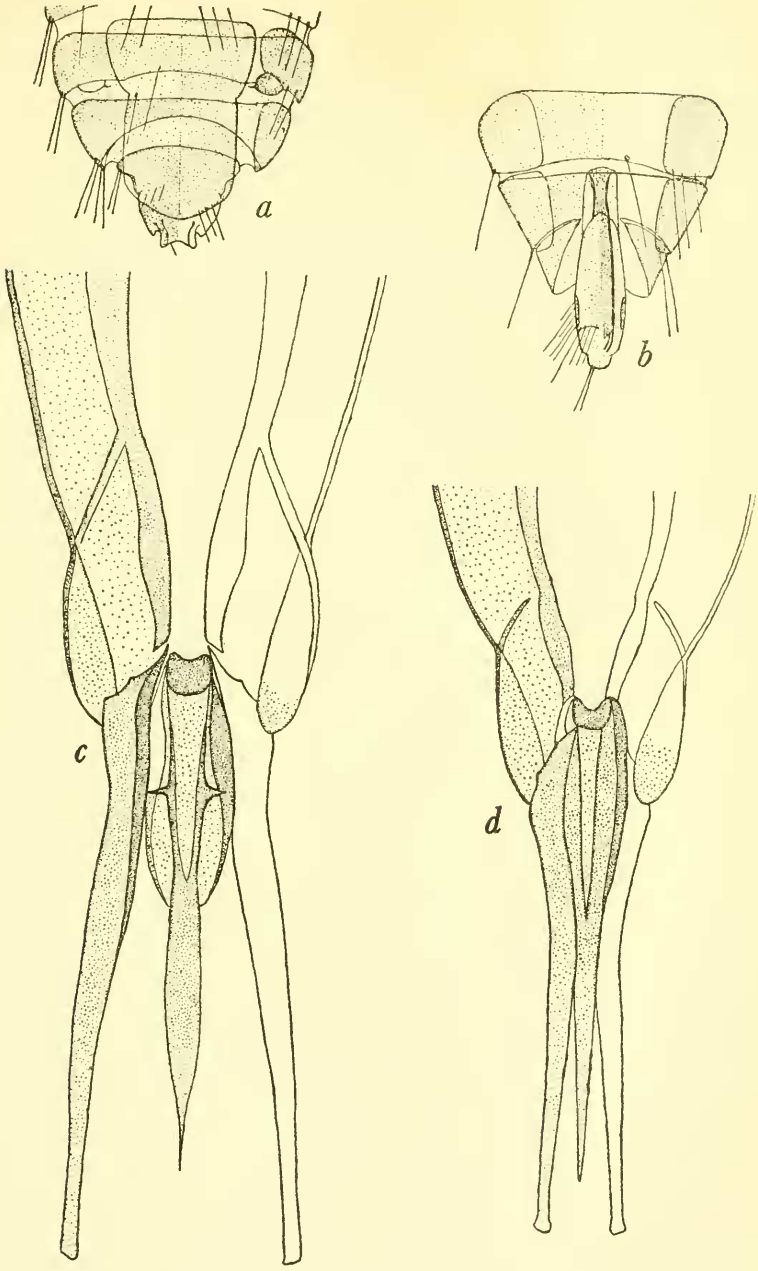

FIGURE 24.—PTEROCOTES

a–c, *Pterocotes aberrans mexicanus*, new subspecies: *a*, Tip of male abdomen; *b*, tip of female abdomen and female genitalia; *c*, male genitalia.
d, *P. a. colombianus*, new subspecies: Male genitalia.

The differences in body measurements between *mexicanus* and *aberrans* are no more than could be covered by individual variation, except the width of the head at temples in the female, which is less (0.07 mm.), and in the size of the genitalia of both sexes, those of the male being considerably larger, and of the female narrower and differently shaped.

The tergal plate of segment VI in the female is continuous, as in *aberrans*, not broken medially as in *taoi*. The scent glands in the male are located on the fifth segment, at the inner, posterior edge of the pleurite. They are globular in shape, with a short tubular outlet, as in *aberrans*.

PTEROCOTES ABERRANS COLOMBIANUS, new subspecies

FIGURE 24, *d*

Types.—Male and female, adults, from *Tinamus serratus ruficeps*, collected by the author at El Bosque, Sierra Perijá, Colombia, June 14, 1941; in U. S. National Museum.

Diagnosis.—The male of this race is very close to *P. taoi* in size of body segments, but the antennae and genitalia differ considerably. The antennae are longer (0.40 against 0.326); the basal plate longer and wider (0.37 by 0.17 against 0.26 by 0.15); the paramers are longer (0.26 against 0.16); and the endomeral plate and penis are twice as long and some wider (0.25 by 0.045 against 0.12 by 0.038). The paramers are straighter and slenderer than in *aberrans* and especially *mexicanus* (like *taoi*) and have the tips slightly enlarged but *not bluntly pointed.* The seventh abdominal segment, as well as the sternal genital plate, is very similar to *mexicanus*.

The female differs considerably from that of *taoi* in body measurements and is also much smaller than either *aberrans* or *mexicanus;* the head is longer at the temples and wider at both frons and temples; all three thoracic segments are both longer and wider; the antennae are shorter, while the genital apparatus is both shorter and narrower.

The female genital apparatus resembles that of *mexicanus* rather than *aberrans*, but there is very little difference between all the races of *aberrans* in the chaetotaxy of this organ. However, in *taoi* the hairs are somewhat shorter and considerably finer, but *all* forms have the two pairs of curving spines at the tip of the ventral lip (the 1936 published figure of *aberrans* is incorrect in this respect).

In *aberrans* the tip of the abdomen is more rounded than in the other races, while in *taoi* it is most acuminate, *mexicanus* and *colombianus* being intermediate and similar. The temples in the female of *colombianus* are the most acuminate, and those of *aberrans* the least (the 1936 figure is also incorrect in this detail).

Specimens taken on *Tinamus s. serratus* are referrable to *P. a. aberrans*, as stated previously (Carriker, 1936, p. 157). The only differences worthy of note are the following: The length of head at temples in the male is less in insects from *T. s. serratus*, while the width is about the same, and the length at occiput exactly the same; the width at frons is the same, while at the point posterior to the antennal fossae slightly less in the type of *aberrans*, as well as at the lateral emargination. Practically all other differences in measurements may well be attributed to individual variation.

PTEROCOTES TAOI Carriker

FIGURE 25, *a–c*

Pterocotes aberrans taoi CARRIKER, Lice of the tinamous, p. 158, pl. 26, figs. 3, 3a, 1936. (Host: *Tinamus tao kleei.*)

Male cotype, from *Tinamus tao weddelli*, collected by the author at Palmar, Dept. Cochabamba, Bolivia, July 12, 1937; in collection of author.

This species was described from a single female. I have since been able to secure specimens of what is apparently this species from the following hosts: *Tinamus tao weddelli*, Palmar, Bolivia, one male; *Tinamus t. tao*, Sierra Perijá, Colombia, one male and 10 females.

The two subspecies of *Tinamus tao* (*kleei* and *weddelli*) are generally considered to be inseparable, so that we may infer that the male *Pterocotes* taken on *T. t. weddelli* is the male of the *Pterocotes* described from a female collected on *T. tao kleei.*

The single male collected on *T. t. tao* has, unfortunately, lost its head, but the measurements of the body segments and the genitalia are very close to those of the male taken on *T. tao weddelli* (male cotype of *P. taoi*). The only appreciable differences are the following: The abdomen is some smaller (not a reliable character); the basal plate is a little longer and the base of the paramers somewhat narrower (0.046 against 0.062); the endomeral plate is a trifle longer and narrower. The females from *T. t. tao* are also very close to the type of *P. taoi*, the only appreciable differences in measurements being the following: Mesothorax longer and wider; abdomen a little smaller, and genitalia considerably narrower (0.065 against 0.11). However, these slight differences do not warrant the separation of the specimens from the three subspecies of *Tinamus tao*, and it seems best to call them all *Pterocotes taoi* Carriker.

The male of *P. taoi* differs from the males of *P. a. aberrans* and *P. a. mexicanus* as follows: Whole body, all body segments, and genital armature very much smaller, with the single exception of the width of the head at the lateral emarginations, which is the same (0.31 against 0.303); the basal plate and paramers are but little more than half

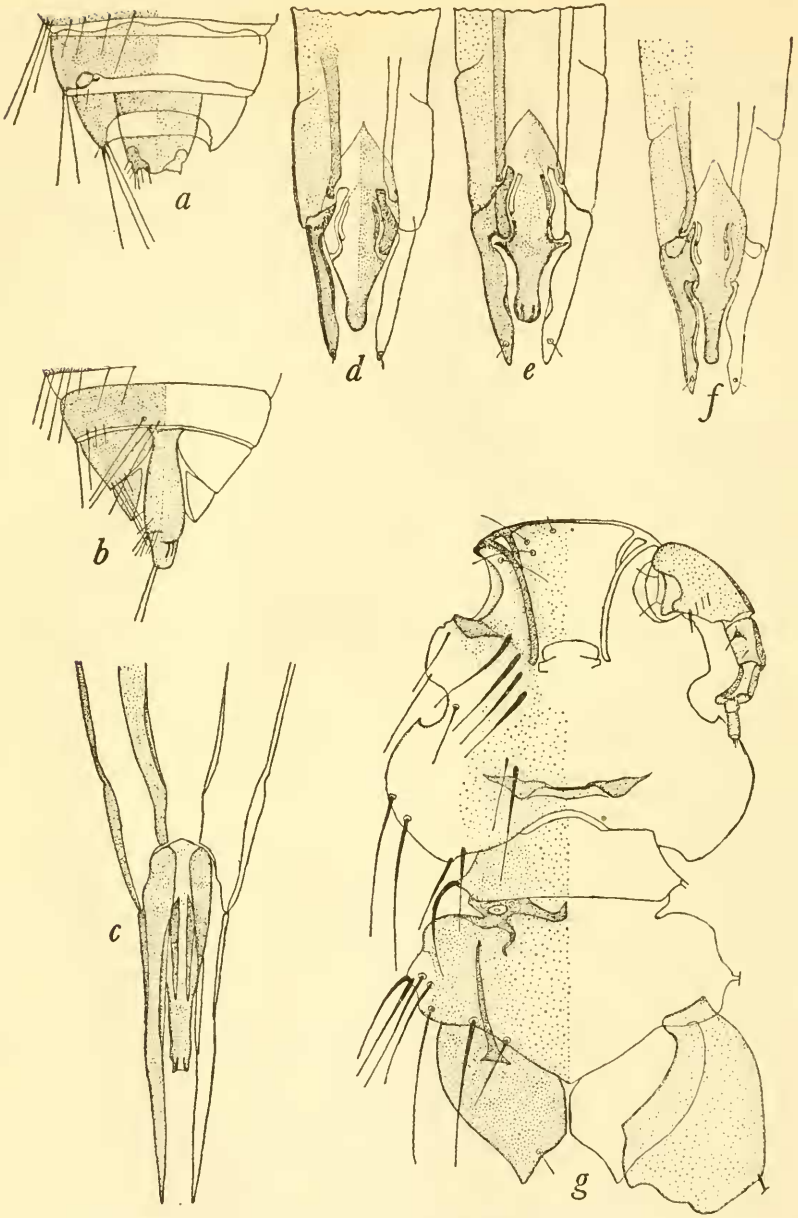

FIGURE 25.—PTEROCOTES, PECTENOSOMA, and HEPTAGONIODES

a-c, *Pterocotes taoi* Carriker: *a*, Tip of male abdomen; *b*, tip of female abdomen and female genitalia; *c*, male genitalia.

d, *Pectenosoma verrucosa inconspicua*, new subspecies: Male genitalia.

e, *P. v. punensis*, new subspecies: Male genitalia.

f, *P. v. nigriceps*, new subspecies: Male genitalia.

g, *Heptagoniodes dimorphus*, new species: Male head and thorax

the length of those in *aberrans*, the paramers *less* and the endomeral plate *much less* than half the length of those in both *mexicanus* and *aberrans*. The most striking difference is in the endomeral plate, which is not elongated into a slender, needlelike point but is abruptly truncate and extends but little beyond the middle of the paramers. This character, in connection with the small size, has led me to give *taoi* specific rank, since it differs from all other known forms in this respect. The differences between *taoi* and *colombianus* are given under the latter.

MEASUREMENTS OF PTEROCOTES TAOI

Structure	Male (cotype) from *Tinamus tao weddelli*		Female (type) from *T. t. kleei*		Male (without head) from *T. t. tao*		Female from *T. t. tao*	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.60		1.93				1.77	
Head: frons		0.27		0.39				0.38
Head: emargination		0.31						
Head: temples	0.47	0.65	0.47	0.69			0.47	0.69
Head: occiput	0.37		0.39				0.38	
Prothorax	0.195	0.43	0.18	0.43	0.174	0.43	0.174	0.434
Mesothorax	0.22	0.57	0.16	0.58	0.225	0.566	0.215	0.59
Metathorax	0.15	0.50	0.14	0.48	0.15	0.48	0.15	0.51
Abdomen	1.12	0.61	1.28	0.62	0.97	0.555	1.15	0.59
Antennae	0.326	0.115	0.25				0.24	0.045
Basal plate	0.26	0.15			0.33	0.14		
Paramers	0.16	0.062			0.16	0.046		
Endomeral plate	0.12	0.038			0.13	[1] 0.03		
Genitalia			0.39	0.11			0.35	0.065

[1] Tip of penis broken off.

Genus PECTENOSOMA Ewing

PECTENOSOMA VERRUCOSA (Taschenberg)

Goniocotes verrucosus TASCHENBERG, Die Mallophagen, pp. 68, 94, pl. 3, fig. 4, male, 1882. (Host: *Crypturellus variegatus.*)

When my "Lice of the Tinamous," 1936, was published I had seen no material of this species from the type host, but I assumed that a single female from *C. variegatus salvini*, as well as numerous males and females from *C. undulatus yapura*, was the same as Taschenberg's type. My drawing of the female was made from the specimen taken on *C. v. salvini*, while the male genitalia were taken from a specimen off *C. u. yapura.*

Miss Clay (1937, p. 155, fig. 13) subsequently published a note on this species, stating that she had compared specimens of *P. verrucosa* from *C. v. variegatus* with others from *C. variegatus salvini* and found them to be the same, but that those from *C. undulatus yapura* were slightly different. Her figure of the genitalia of true *verrucosa* amply substantiates this statement, so that the figure published by me of the

genitalia of *P. v. verrucosa* is incorrect, and belongs, rather, to the new race described below. In my present treatment of this group, according to the number of papillae present on abdominal tergites III to V, the male of typical *verrucosa* cannot be included, since it has not been seen, although it is of rather more importance than the female in this character. Nevertheless, there is one significant feature present in the female from *C. v. salvini*, viz: the presence of a short third row of smaller papillae above the others, on all three tergites under consideration.

Specimens of *P. verrucosa* were taken on all four forms of tinamous collected on the Mexican expedition. A careful study of all these specimens, together with specimens of *P. v. verrucosa*, *P. v. parva*, *P. v. angusta*, and *P. v. yapurae*, reveals the following facts:

There is considerable individual variation in the number of papillae present on the various body segments, but outside of this individual variation there is a definite variability in the number to be found on the abdominal tergal plates III, IV, and V. Among all the males, that of *parva* invariably has the greatest number, there always being present two to five in *both rows* on *all* the segments under discussion, while among the females *verrucosa* has the highest number (five to eight in both rows on all segments) and in addition a *third row* of smaller papillae above the other two. The males from *Tinamus major percautus* and *Crypturellus soui meserythrus* have *no* papillae at all on segments IV and V and but one row of three or four on segment III, while in *angusta* there are none on the fifth segment, with one row of two to four on segments III and IV.

The only females that have no papillae on segment V are those from *C. cinnamomeus sallaei* (no male taken) and *T. major percautus*, but both have double rows of four or five each on the other two segments.

There is also a wide range of measurements between the parasites from different hosts, by far the largest being from *Tinamus*, while *parva*, from *C. tataupa*, is the smallest, with those from *C. soui meserythrus* almost as small.

It is unusual to find that the genitalia of all three of the males taken from the different Mexican hosts are practically identical in shape and detail, differing only very slightly in the length of the paramers, while the width at base of paramers and the combined length of endomeral plate and penis are identical in the three, as well as the length of the basal plate.

The genitalia resemble very closely those of *P. v. yapurae* (see Carriker, 1936, pl. 29, fig. 1b). It is thus apparent that the only char-

acters that may be utilized for the separation of some of the forms of this compact group into subspecies are the comparative measurements and the number of papillae on certain of the abdominal segments. With these facts in mind it seems advisable to give subspecific rank to all the different Mexican forms although the single female from *C. cinnamomeus sallaei* is very close to the nominate form in measurements but has the arrangement of papillae different.

Figures of the genitalia of three of the new South American forms are given, while a figure of *yapurae* has already been published, and the three Mexican forms have the genitalia so close to those of *yapurae* that they do not need to be figured. The known races of the species are as follows:

KEY TO THE SUBSPECIES OF PECTENOSOMA VERRUCOSA

a.[1] Tergites III, IV, and V in female with 3 rows of papillae (upper row smaller) ---------- verrucosa

a.[2] Tergites III, IV, and V in female with never more than 2 rows of papillae and sometimes one of these sclerites in one or both sexes with papillae absent.

b.[1] Tergite V in female without papillae.

c.[1] Size smaller (head 0.31 by 0.53 in female; male unknown) -- cinnamomea

c.[2] Size larger (head 0.34 by 0.63 in female); tergite V in both sexes without papillae; tergite IV in male also without papillae ---------- tinami

b.[2] Tergite V in female with but 1 row of 2 papillae; male with none in IV and V ---------- boucardi

b.[3] Tergite V in female always with 2 rows of papillae.

c.[1] Tergite V in male without papillae; size small; abdomen narrower in female than in male (0.57); antennae 0.18 in both sexes ------ angusta

c.[2] Tergite V in male always with 1 row of papillae (1 to 5); female always with 2 rows (2 to 5).

d.[1] Tergites III and IV in male with but a single row of papillae (3 to 5) (a few specimens of *punensis* and *yapurae* will fall into this section, but they usually have two rows); female with 2 rows of 4 to 6.

e.[1] Size larger (head in male 0.30 to 0.34 by 0.48 to 0.50); tergite V in female with 2 rows of 4 or 5 papillae, or 2 or 3.

f.[1] Tergites III, IV, and V in male with a single row of 3 papillae; genitalia of different size (see fig.) ---------- punensis

f.[2] Tergite III in male with a single row of 4 papillae, tergite IV with 3, and tergite V with a single row of 1; genitalia differ from those of *punensis* (see fig.) ---------- nigriceps

e.[2] Size smaller (head in male 0.28 by 0.45; antennae 0.15 in male, 0.21 in female); genitalia different (see fig.); tergite V in female with 2 rows of 2 to 4 papillae; in female tergite III has 1 row of 4 to 5; IV has 1 row of 3 to 4; V has 1 row of 2 ---------- meserythra

d.[2] Tergite III in male always with 2 rows of papillae, and some specimens tergite IV also ---------- inconspicua, punensis, yapurae

c.[3] Tergite V in both sexes with 2 short rows of papillae; size very small ---------- parva

PECTENOSOMA VERRUCOSA VERRUCOSA (Taschenberg)

Citation of original description on page 201. (Host: *Crypturellus v. variegatus;* taken also on *C. variegatus salvini.*)

PECTENOSOMA VERRUCOSA PARVA Carriker

Pectenosoma verrucosa parva CARRIKER, Lice of the tinamous, p. 164, pl. 29, figs. 2, 2a, 1936. (Host: *Crypturellus t. tataupa*, Bolivia.)

PECTENOSOMA VERRUCOSA ANGUSTA Carriker

Pectenosoma verrucosa angusta CARRIKER, Lice of the tinamous, p. 165, pl. 29, fig. 3, 1936. (Host: *Crypturellus garleppi affinis*, Bolivia.)

PECTENOSOMA VERRUCOSA YAPURAE, new subspecies

Pectenosoma verrucosa verrucosa (Taschenberg) CARRIKER, Lice of the tinamous, p. 164 (*partim*), 1936.

Types.—Male and female, adults, from *Crypturellus undulatus yapura*, collected by the author at Puerto Yessup, Peru, February 19, 1930; in collection of author.

Also from *C. u. undulatus*, Bolivia.

PECTENOSOMA VERRUCOSA TINAMI, new subspecies

Types.—Male and female, adults, from *Tinamus major percautus*, collected by the author on Cerro Tuxtla, Veracruz, Mexico, March 23, 1940; in U. S. National Museum.

PECTENOSOMA VERRUCOSA BOUCARDI, new subspecies

Types.—Male and female, adults, from *Crypturellus b. boucardi*, collected by the author on Cerro Tuxtla, Veracruz, Mexico, March 28, 1940; in U. S. National Museum.

PECTENOSOMA VERRUCOSA MESERYTHRA, new subspecies

Types.—Male and female, adults, from *Crypturellus soui meserythrus*, collected by the author on Cerro Tuxtla, Veracruz, Mexico, May 8, 1940; in U. S. National Museum.

PECTENOSOMA VERRUCOSA CINNAMOMEA, new subspecies

Type.—Female, adult, from *Crypturellus cinnamomeus sallaei*, collected by the author at Tres Zapotes, Veracruz, Mexico, March 27, 1940; in U. S. National Museum.

PECTENOSOMA VERRUCOSA PUNENSIS, new subspecies

FIGURE 25, *e*

Types.—Male and female, adults, from *Crypturellus obsoletus punensis*, collected by the author at Sandillani, Bolivia, November 25, 1934; in collection of author.

ARRANGEMENT OF PAPILLAE ON ABDOMINAL TERGITES III, IV, AND V IN SUBSPECIES OF PECTENOSOMA VERRUCOSA

Tergite	*verrucosa*	*parva*		*inconspicua*		*punensis*		*yapurae*		*nigriceps*	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
III	3	3	5	2-3	5	2-3	5-6	0-4	5	0	4-5
	5	5	5	4-5	5-6	4-5	6-7	4-6	6	4	5-6
	8										
IV	2	2	4	0	4-5	0-2	4-6	0-2	4-6	0	4-5
	6	4	5	3-4	4-6	4-5	5-6	3-5	5-6	3	4-5
	7										
V	2	2	3	0	4	0	4-5	0	4-5	0	2-4
	4	2	4	2-3	4-5	3	4-5	0-3	4-5	1	3-4
	6										

Tergite	*angusta*		*tinami*		*meserythra*		*boucardi*		*cinnamomea*
	Male	Female	Male	Female	Male	Female	Male	Female	Female
III	0	4	0	5	0	4	0	6	4-5
	4	6	4	5	4	5	3	6	5-6
IV	3	4	0	4	0	4	0	5	3-4
	3	5	0	5	4	5	0	5	4-5
V	0	3	0	0	0	3	0	0	0
	0	4	0	0	2	4	0	2	0

MEASUREMENTS OF PECTENOSOMA VERRUCOSA

Subspecies	Body (length)	Head	Prothorax	Mesothorax	Metathorax	Abdomen	Antennae (length)
yapurae ♂	1.34	0.28 x 0.51	0.14 x 0.30	0.13 x 0.51	0.12 x 0.44	0.71 x 0.72	0.217
yapurae ♀	1.57	0.33 x 0.54	0.14 x 0.33	0.14 x 0.54	0.13 x 0.46	0.89 x 0.82	0.185
cinnamomea ♀	1.67	0.31 x 0.53	0.14 x 0.31	0.14 x 0.51	0.13 x 0.42	0.91 x 0.75	0.185
inconspicua ♂	1.20	0.28 x 0.48	0.13 x 0.27	0.13 x 0.46	0.10 x 0.39	0.70 x 0.64	0.16
inconspicua ♀	1.38	0.29 x 0.50	0.14 x 0.27	0.13 x 0.47	0.12 x 0.38	0.87 x 0.68	0.15
punensis ♂	1.28	0.33 x 0.48	0.12 x 0.28	0.14 x 0.46	0.12 x 0.39	0.76 x 0.67	0.19
punensis ♀	1.45	0.35 x 0.51	0.13 x 0.29	0.13 x 0.49	0.13 x 0.43	0.90 x 0.69	0.174
nigriceps ♂	1.27	0.31 x 0.50	0.13 x 0.28	0.13 x 0.49	0.11 x 0.43	0.74 x 0.68	0.17
nigriceps ♀	1.50	0.33 x 0.52	0.15 x 0.30	0.13 x 0.50	0.13 x 0.42	0.95 x 0.76	0.16
tinami ♂	1.30	0.30 x 0.52	0.15 x 0.31	0.12 x 0.50	0.10 x 0.43	0.74 x 0.72	0.21
tinami ♀	1.56	0.34 x 0.63	0.17 x 0.33	0.13 x 0.60	0.13 x 0.48	0.98 x 0.80	0.25
meserythra ♂	1.15	0.28 x 0.45	0.12 x 0.28	0.11 x 0.46	0.12 x 0.39	0.69 x 0.63	0.152
meserythra ♀	1.30	0.30 x 0.48	0.12 x 0.28	0.12 x 0.48	0.13 x 0.41	0.80 x 0.72	0.21
boucardi ♂	1.34	0.30 x 0.51	0.15 x 0.30	0.12 x 0.50	0.14 x 0.42	0.79 x 0.71	0.14
boucardi ♀	1.56	0.33 x 0.56	0.15 x 0.35	0.13 x 0.54	0.15 x 0.47	1.00 x 0.82	0.185
parva ♂	1.10	0.25 x 0.38	0.09 x 0.22	0.09 x 0.37	0.08 x 0.33	0.64 x 0.57	0.14
parva ♀	1.18	0.25 x 0.39	0.09 x 0.23	0.09 x 0.38	0.08 x 0.32	0.73 x 0.58	0.13
angusta ♂	0.99	0.28 x 0.48	0.11 x 0.28	0.11 x 0.46	0.13 x 0.40	0.72 x 0.67	0.18
angusta ♀	1.32	0.31 x 0.44	0.11 x 0.28	0.11 x 0.43	0.09 x 0.37	0.80 x 0 57	0.18
verrucosa ♂	1.27	0.30 x 0.50	(whole thorax=0.23 x 0.50)			0.74 x 0.69	
verrucosa ♀	1.53	0.35 x 0.55	0.14 x 0.31	0.14 x 0.54	0.14 x 0.45	0.94 x 0 78	0.195

PECTENOSOMA VERRUCOSA NIGRICEPS, new subspecies

FIGURE 25, *f*

Types.—Male and female, adults, from *Crypturellus soui nigriceps*, collected by the author at Tamborapa, Peru, July 14, 1933; in collection of author.

PECTENOSOMA VERRUCOSA INCONSPICUA, new subspecies

FIGURE 25, *d*

Types.—Male and female, adults, from *Crypturellus soui inconspicuus*, collected by the author at Shapaja, Peru, November 1933: in collection of author.

Genus DOCOPHOROCOTES Carriker

DOCOPHOROCOTES SEXSETOSUS SECUNDUS, new subspecies

FIGURES 26, *c*, *d*; 27, *a*

Types.—Male and female, adults, from *Rhynchotus rufescens maculicollis*, collected by the author at Padilla, Bolivia, January 5, 1938; in collection of author.

MEASUREMENTS OF DOCOPHOROCOTES SEXSETOSUS

Structure	*sexsetosus*				*secundus*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.34		1.56		1.15		1.54	
Head: frons		0.39		0.39		0.37		0.37
Head: temples		0.55		0.564		0.545		0.55
Head: occiput	0.43		0.456		0.44		c.467	
Prothorax	0.13	0.314	0.14	0.326	0.12	0.314	0.13	0.33
Mesothorax	0.15	0.434	0.15	0.445	0.11	0.435	0.12	0.456
Metathorax	0.15	0.40	0.174	0.42	0.135	0.39	0.13	0.40
Abdomen	0.716	0.685	0.93	0.694	0.67	0.59	0.88	0.60
Antennae	0.195	0.048	0.18	0.04	0.205	0.043	0.195	0.04
Basal plate	0.25	0.08			0.22	0.077		
Paramers	0.09	0.068			0.087	0.065		

Diagnosis.—There is very little difference in size between the nominate form and the new race, although the abdomen of both sexes is shorter and narrower in *secundus;* the preantennal area is of decidedly different shape, the whole frons being uniformly circular, while in *sexsetosus* its sides are slightly *concave;* the width of the head at the base of the more pointed trabeculae is narrower; the internal projections on the frons are of different shape and length (see fig.), as well as the buccal cavity and the internal clypeal bands; the occipital bands

are much less developed and are broken medially, while in *sexsetosus* they are entire. The chaetotaxy of the abdomen is also distinct, there being more hairs on *secundus*, while they are mostly longer and slenderer; the shape of segment VII is also different. The male genitalia, while of the same general pattern as in *sexsetosus*, differ decidedly as to proportions and detail, especially in the basal plate and paramers (see fig.). In the female the genital plate, as well as the posterior margin of segment VII, is differently shaped.

The new race is represented by four males and five females, taken on three individuals of the host, collected at Padilla and Samaipata, Bolivia.

Subfamily ORNICHOLACINAE Carriker

Genus HEPTAGONIODES Carriker

Heptagoniodes CARRIKER, Lice of the tinamous, p. 166, 1936. [Genotype: *H. mirabilis* Carriker=*Heptagoniodes agonus* (Nitzsch).]

This genus was created solely on the characters of the male, the female being unknown at that time, or rather the two sexes were known but not associated with each other; therefore it becomes necessary to amend the generic diagnosis to include the characters of the female.

Sexes strongly dimorphic, not only in the shape of the antennae, but in the shape of the whole head, the female strongly resembling both sexes of *Kelloggia*, especially the female, having the temples expanded laterally and posteriorly, with the front narrow and rounded and with the sides of head straight and strongly divergent; sides of head bifurcated in the female, as in both sexes of *Kelloggia;* antennae of female short and slender, but with first segment considerably swollen and rounded and attached on the *under* side of the head; thoracic segments and abdomen practically the same in both sexes, while the female is but slightly larger than the male.

Note on synonymy.—Now that the true identity of *Goniocotes agonus* Nitzsch has been established, it is possible to clear up the synonymy of the various genera that have become involved with it by previous authors.

Taschenberg erected the subgenus *Lepidophorus* in 1882 and placed in it *Goniocotes agonus* Nitzsch and *L. coniceps*, sp. nov. [=*Hypocrypturellus coniceps* (Taschenberg)]. In 1916 Harrison made the genus *Ornicholax* Carriker a new name for *Lepidophorus* Taschenberg (name preoccupied), which was totally unwarranted, because no species placed in *Ornicholax* was included by Taschenberg under *Lepidophorus*.

In 1936, on page 171 of my "Lice of the Tinamous," I called attention to this fact, and designated *Kelloggia* Carriker, 1903, as the new name for *Lepidophorus*, which also was in error, being contrary to the

International Code. We now find that *Heptagoniodes* Carriker, 1936, is actually the new name for *Lepidophorus* Taschenberg, 1882, it automatically replacing *Lepidophorus* since the two generic concepts and names are isogenotypic through synonymy. Therefore we have the following facts:

Kelloggia Carriker, 1903. Type, *Kelloggia brevipes* Carriker. Monobasic. The type designation of Carriker, 1936, is invalid because the species designated was not originally included in the genus.

Lepidophorus Taschenberg, 1882. No type designated. Two species included, the second not congeneric with the first.

Ornicholax Carriker, 1903. Type, *Ornicholax robustus* Carriker. Monobasic.

Heptagoniodes Carriker, 1936. Type, *Heptagoniodes mirabilis* Carriker. *Heptagoniodes mirabilis* Carriker=*Goniocotes agonus* Nitzsch.

Kelloggia now stands in the clear, with its monobasic type; also *Ornicholax*, with type designated by the author. Since no type was designated for *Lepidophorus*, the first species under it should be so designated, viz: *Goniocotes agonus* Nitzsch. Therefore we have the following:

Kelloggia Carriker. Genotype: *K. brevipes* Carriker.

Ornicholax Carriker. Genotype: *O. robustus* (= *O. alienus robustus* Carriker.)

Heptagoniodes Carriker. Genotype: *Goniocotes agonus* Nitzsch (through synonymy). Syn. *Lepidophorus* Taschenberg. Genotype: *Goniocotes agonus* Nitzsch.[8]

HEPTAGONIODES AGONUS (Nitzsch)

Goniocotes agonus NITZSCH, *in* Giebel, Zeitschr. für ges. Naturw., vol. 28, p. 387, 1866. (Host: *Tinamus tao.*)

Lepidophorus agonus (Nitzsch) TASCHENBERG, Die Mallophagen, p. 61, pl. 1, fig. 6 (female), 1882.

Kelloggia agona (Nitzsch) CARRIKER, Lice of the tinamous, p. 175, 1936.

Heptagoniodes mirabilis CARRIKER, Lice of the tinamous, p. 167, pl. 30, figs. 3, 3a (male), 1936. (Host: *Tinamus t. tao.*)

It is now a well-established fact that *Goniocotes agonus* Nitzsch, described from a single female, is the female of *Heptagoniodes mirabilis* Carriker. Dr. Hopkins (1940, p. 420) has presented a very clear and perfectly logical exposition of the case, with which I am thoroughly in accord, while the taking of both sexes of this genus by me in 1937 had already convinced me of this fact. The above-mentioned specimens were taken on *Tinamus tao weddelli*, and the females resemble rather closely Taschenberg's figure of *Goniocotes agonus*, but the males are different from *Heptagoniodes mirabilis* Carriker, taken on *Tinamus t. tao.* The taking of both sexes of *Heptagoniodes* together on the same individual host (a subspecies of *T. tao*) leaves no further room for argument concerning the true relationship between *Goniocotes agonus* Nitzsch and *Heptagoniodes mirabilis* Carriker.

[8] I am greatly indebted to Dr. E. A. Chapin, of the U. S. National Museum, for his assistance in untangling the synonymy of the four genera here discussed.

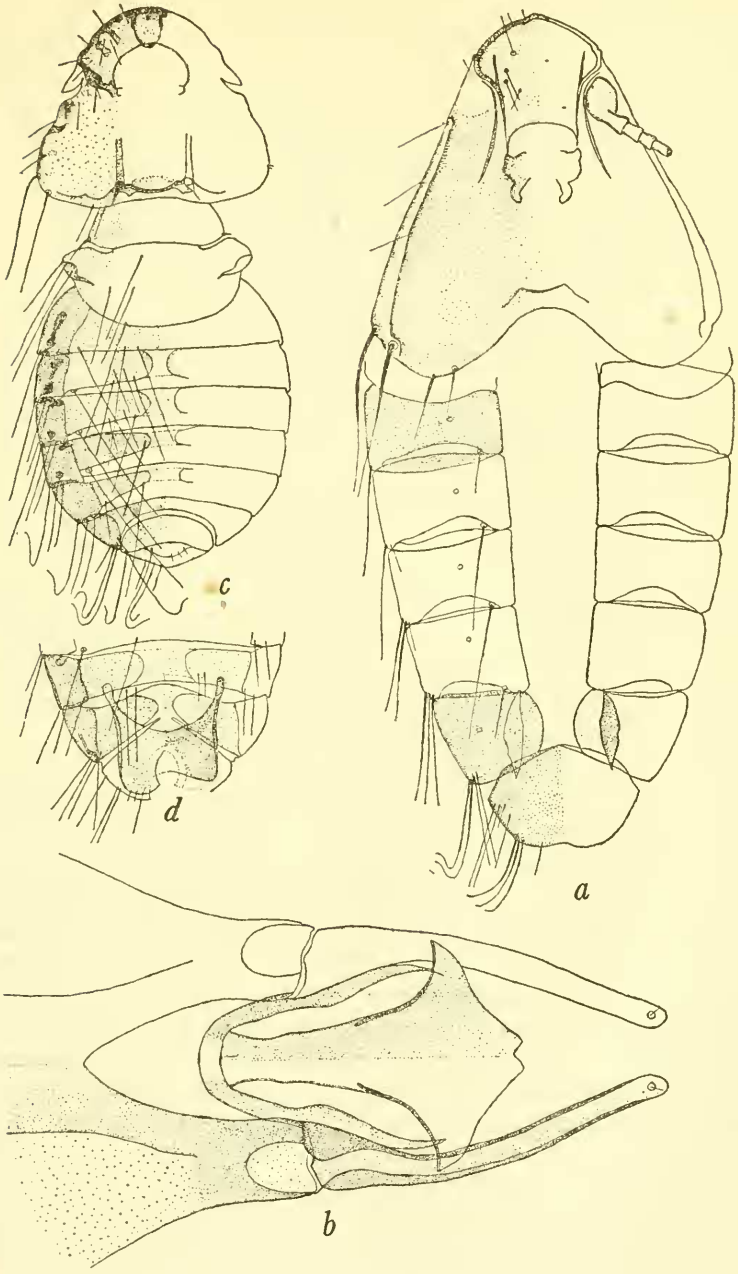

FIGURE 26.—HEPTAGONIODES and DOCOPHOROCOTES

a, b, Heptagoniodes dimorphus, new species: *a*, Female head and abdomen; *b*, male genitalia. *c, d, Docophorocotes sexsetosus secundus*, new subspecies: *c*, Body of male; *d*, female abdominal segment VII.

In the published figure of *H. mirabilis* (Carriker, 1936, pl. 30, fig. 3), only one hair is shown at the outer edge of the mandibles, where *four* long, strong hairs are present in *clayi* Guimarães and Lane and *dimorphus*, new species. A reexamination of the type of *mirabilis* shows three small pustules in a line posterior to the single hair shown in the published figure. Undoubtedly the hairs from these pustules have been lost, but they were certainly very much smaller than those in *dimorphus*, probably of the same size as the single hair shown in the figure.

HEPTAGONIODES DIMORPHUS, new species

FIGURES 25, *g*; 26, *a*, *b*

Types.—Male and female, adults, from *Tinamus tao weddelli*, collected by the author at Palmar, Dept. Cochabamba, Bolivia, on July 12, 1937; in collection of author.

Diagnosis.—Male: There is a strong superficial resemblance between the new form and *agonus*, but *dimorphus* is somewhat larger and differs very much in the proportions of the head and thoracic segments, while the abdomen is practically the same, both in structure and measurements. The male genital armature is strikingly different, having the basal plate longer, the paramers nearly twice as long, and the endomeral plate *more* than twice as long, while the latter two are very much narrower and of very different shape.

In some respects *dimorphus* resembles *clayi* Guimarães and Lane,[9] but the genital armature is quite distinct, as well as the proportions of the head and thorax.

The female of *dimorphus* differs from *clayi* (as figured by Kéler), in the size, proportions of head, and its shape, while the abdomen is much longer and narrower, with apical portion much attentuated. The shape of the head is nearer to Taschenberg's figure of *agonus* than to *clayi*, but the abdomen is very much slenderer, while segment VI of abdomen has the paratergal plates separated medially (there are no tergal or sternal plates in this genus) by a considerable hyaline space, while in Taschenberg's figure of *agonus* they are united.

The new species is represented by two males and four females (including the types).

Remarks.—In the male of *dimorphus* the lateral emarginations of the head resemble very strongly those shown in Piaget's figure of his *H. excavatus*, having a very sharp point at the posterior edge of the emargination.

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[9] There is not the slightest doubt that Kéler (1938, p. 323) has described and figured *H. clayi* as *H. agonus*. The shape of head, chaetotaxy of head, and genital armature are exactly the same, while the specimen figured was taken from the same host as *clayi* (*Tinamus solitarius*). Dr. Hopkins has already called attention to this fact.

MEASUREMENTS OF HEPTAGONIODES

Structure	*agonus* (male)		*dimorphus*			
			Male		Female	
	Length	Width	Length	Width	Length	Width
Body	2.32		2.39		2.43	
Head: frons		0.39		0.41		0.29
Head: emargination		0.48		0.52		
Head: temples	0.67	0.69	0.75	0.80	0.77	0.74
Head: occiput	0.56		0.63		0.64	
Prothorax	0.20	0.48	0.174	0.50	0.195	0.57
Mesothorax	0.336	0.63	0.37	0.70	0.36	0.69
Metathorax	0.30	0.52	0.35	0.57	0.347	0.55
Abdomen	1.34	0.89	1.39	0.85	1.45	0.89
Antennae	0.477	0.14	0.50	0.174	0.25	0.068
Basal plate	1.02	0.17	0.86	0.17		
Paramers	0.12	0.098	0.20	0.15		
Endomeral plate	0.087	0.065	0.18	0.12		

Genus ORNICHOLAX Carriker

ORNICHOLAX ALIENUS (Giebel)

Goniocotes alienus Giebel, Zeitschr. für ges. Naturw., vol. 28, p. 389, 1866. (Host: *Crypturus macrourus.*)

Strongylocotes alienus (Giebel) Taschenberg, Die Mallophagen, p. 59, 1882.—Carriker, Lice of the tinamous, p. 93, 1936.

An examination by Keler of the type of *Goniocotes alienus* Giebel shows it to be an *Ornicholax*, not *Strongylocotes*, as I, having followed Taschenberg, had previously stated.

Kéler has published a figure of the male genitalia of an *Ornicholax* taken on *Tinamus solitarius*, which he says is "exactly like the type" of *alienus*. Then he goes on to say that figures published by Carriker (1936) of the genitalia of *O. robustus* and *O. taoi* are incorrect and that *Ornicholax robustus* Carriker is a synonym of *O. alienus* (Giebel). In the first place, having examined the genitalia of *Ornicholax* from six different species of *Tinamus*, I maintain that if Kéler's figure, which he calls the genitalia of *O. alienus* (Giebel), was drawn from a specimen collected on *Tinamus solitarius* and *not the actual type of alienus*, it is impossible to accept his statement that they are the *same.* While admitting that there are some errors in my published figures of the genitalia of *O. robustus* and *O. taoi*, I further maintain that Kéler, not having seen my material, had no basis for saying that *robustus* was a synonym of *alienus.* As a matter of fact, the genitalia of *O. a taoi* are much closer to those of *solitarius* Guimarães and Lane than those of *robustus.* In further proof of the unreliability of Kéler's statements we have his report to Miss Clay concerning specimens of *Ornicholax* from *Tinamus major percautus* of Mexico, of which I have an adequate series.

Kéler says: "The type of *alienus* is very similiar to your male from *T. major percautus*, but it differs distinctly in the shape of the prothorax, which in *alienus* type is distinctly trapezoidal, the points lying behind the middle of the sides, as well as in the form of the last segment, which in the type *alienus* is a little longer than wide (336×288 microns)."

The material before me (males from six species of *Tinamus*) shows absolutely *no variation* in the shape of the prothorax. It is true that there is some variation in size, but the general shape is the same, agreeing precisely with the shape of the prothorax of *O. solitarius* of Guimarães and Lane, as shown in the figure published by them. As for the last abdominal segment, all males examined (except that of *O. a. robustus*) have this segment *exactly as long as broad* (ranging from 0.27 to 0.303 mm.). In *O. a. robustus* this segment *is* very slightly longer than wide (0.297 by 0.285 mm.), but the difference is so slight that it has no value whatever.

Taking the above facts in consideration, I am not prepared to accept Dr. Hopkins's theory (1940, p. 419) that the true host of *O. alienus* (Giebel) is *Tinamus solitarius* or that *Ornicholax solitarius* Guimarães and Lane is a synonym of *O. alienus* (Giebel). I prefer, until additional proof is forthcoming, to recognize *O. solitarius* and to leave *O. alienus* (Giebel) in the category of "host unknown."

Furthermore, Taschenberg (1882, p. 59) distinctly says that he examined the type of *alienus* and found it in several pieces, and for that reason he could not give an exact description of it. If the type was in such poor condition as that in 1882, what must be its condition today, and how would it be possible to say that it was any one of the several closely related known forms, without being able to distinguish very clearly the intricate genital armature, whose complicated structure is very difficult to differentiate under the most favorable conditions?

I have examined a series of *Ornicholax alienus* from the following hosts: *Tinamus major castaneiceps* (host of *O. a. robustus*), Pacific slope of Costa Rica; *T. m. fuscipennis*, Caribbean slope of Costa Rica; *T. m. percautus*, Mexico; *T. s. serratus*, Bolivia; *T. serratus ruficeps*, Colombia; *Tinamus t. tao*, Venezuela and Colombia; *T. tao weddelli*, Bolivia.

Unquestionably *O. a. taoi* (from *Tinamus tao*) is one of the most well marked subspecies of *alienus*. In addition to the male type from Venezuela I have a second male from the same host taken in Colombia, and two females from *T. tao weddelli*. The male from Colombia is extremely close to the type in all particulars, while the two females from *T. t. weddelli* seem also to belong here. The head is not so narrow (proportionately) as in the male, but I find that this is true of

most of the material from other hosts. The measurements are larger than for the male (as would be expected), but the proportions run about the same except in the width of the mesothorax, which is wider, but this is also found to be true in specimens from *T. s. serratus* and *T. m. castaneiceps.* We may therefore safely assume that the two females from *T. t. weddelli* are *Ornicholax alienus taoi.*

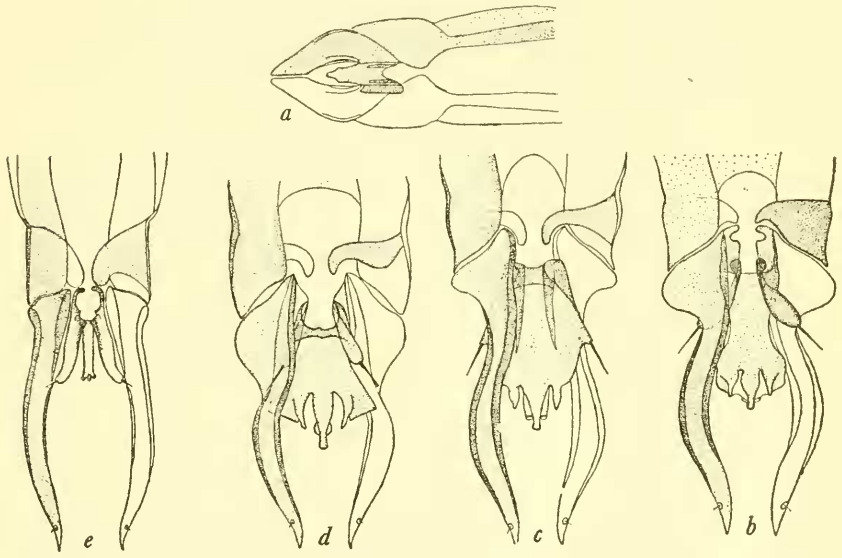

FIGURE 27.—DOCOPHOROCOTES and ORNICHOLAX

a, *Docophorocotes sexsetosus secundus*, new subspecies: Male genitalia.
b, *Ornicholax alienus robustus* Carriker: Male genitalia.
c, *O. a. mexicanus*, new subspecies: Male genitalia.
d, *O. a. boliviensis*, new subspecies: Male genitalia.
e, *O. a. taoi* Carriker: Male genitalia.

The Mexican material from *T. m. percautus* seems to average the largest, while specimens from *T. m. fuscipennis* are the smallest. However, in most cases the proportions run about the same and the differences in size seem to fall within the limits of individual variation for *O. a. robustus.* Nevertheless when we examine the male genital armature we find that there are discrepancies that may not be disregarded. These differences are mostly in the shape of the endomeral plates, but the paramers also differ, so that it seems best to give some of them subspecific rank.

Apparently the genus *Ornicholax* is confined to the avian genus *Tinamus* and, like other genera found on the tinamous, is composed of quite a number of closely related forms, so close, in fact, that all known up to the present time (5 or 6) may be classed as conspecific with *alienus*, although they fall into two groups, viz: *solitarius* (=*alienus?*)

and *taoi* in one group, with *robustus*, *mexicanus*, and *bolivianus* forming the other.

I have not yet discovered a way of separating the females of some of the races, but the males are easily distinguished by the genital armature. *O. solitarius* and *taoi* are easily recognized by their nearly straight paramers, while *alienus* probably also falls into this category. Further study and additional material may show that those forms with the straight paramers should be classed as one species, with the *robustus* group as another. For the present it seems best to classify the known forms of the genus as follows:

ORNICHOLAX ALIENUS ALIENUS (Giebel)

Goniocotes alienus GIEBEL, Zeitschr. für ges. Naturw., vol. 28, p. 389, 1866. (Host: *Crypturus macrourus.*)

Strongylocotes alienus (Giebel) TASCHENBERG, Die Mallophagen, p. 59, 1882.—CARRIKER, Lice of the tinamous, p. 93, 1936.

It is my opinion that we do not know the true host of this insect, and owing to the poor condition of the type itself we may never be able to identify it with fresh material.

ORNICHOLAX ALIENUS ROBUSTUS Carriker

FIGURE 27, *b*

Ornicholax robustus CARRIKER, Univ. Nebraska Studies, vol. 3, No. 2, p. 29, pl. 9, figs. 1, 1c, 1903. (Host: *Tinamus robustus=T. major castaneiceps.*)

Ornicholax robustus robustus CARRIKER, Lice of the tinamous, p. 171, pl. 30, fig. 2, 1936.

This race has been fully discussed above, so that no further comment is necessary. The figure of the male genitalia published by the author in 1936 is not correct in several details, and a corrected one is herewith presented, which was *drawn from the type.* The head is wider than long in this race.

Seven males and six females taken on two individuals of *Tinamus serratus ruficeps*, collected by the author in the Sierra Perijá and the Sierra Nevada de Santa Marta, Colombia, are almost identical in size with specimens from *T. major fuscipennis* (=*O. a. mexicanus*) and are also very close in size to *O. a. robustus*, while the males have the genitalia very close to the latter. The distal end of the endomeral plate is the same, as well as the lateral lobe at base of paramers. The only difference seems to be a slightly different structure at the basal portion of the endomeral plate. This small detail, the only discrepancy be-

tween the two lots of insects, is not of sufficient importance to deserve nomenclatural recognition. Therefore the insects from *T. serratus ruficeps* may be classed as *O. a. robustus* Carriker.

ORNICHOLAX ALIENUS MEXICANUS, new subspecies

FIGURE 27, *c*

Types.—Male and female, adults, from *Tinamus major percautus*, collected by the author on Cerro Tuxtla, Veracruz, Mexico, March 23, 1940; in U. S. National Museum.

Diagnosis.—This race is perhaps closer to *boliviensis* in type of genital armature than to *robustus*, although the endomeral plate differs markedly. The measurements are also nearer to those of *boliviensis*. Like *robustus*, *mexicanus* has the head wider than long in both sexes (male 0.80 by 0.89; female 0.83 by 0.93). This subspecies is represented by two males and three females, including the types, all from the same individual host.

Five males taken on two individuals of *Tinamus major fuscipennis*, collected by the author on the Río Sicsola, Costa Rica, are somewhat slenderer than the Mexican specimens from *T. m. percautus*, but the genital armature is practically identical in every particular (head 0.79 by 0.836 against 0.80 by 0.89; mesothorax, 0.326 by 0.89 against 0.34 by 0.93; metathorax, 0.337 by 0.59 against 0.32 by 0.63; abdomen, 1.28 by 1.17 against 1.41 by 1.28). These slight differences do not seem to be worthy of recognition, especially since the male genitalia are so nearly alike. Therefore the insects from *T. m. fuscipennis* may be called *O. a. mexicanus*.

ORNICHOLAX ALIENUS BOLIVIENSIS, new subspecies

FIGURE 27, *d*

Types.—Male and female, adults, from *Tinamus s. serratus*, collected by the author at Santa Ana, Río Coroico, Bolivia, July 26, 1934; in collection of author.

Diagnosis.—This is the only known race that has the head of equal length and breadth, in both sexes (male 0.78 by 0.78; female 0.84 by 0.836). With the exception of *taoi*, which has the head longer than wide, all the other races have it wider than long.

The genitalia are also quite different in detail and proportions. The paramers are shorter and more sharply curved, with the lateral lobes reaching much farther toward their middle. The lateral, spine-bearing lobes of the endomeral plate are short, while the distal end of the plate has *angulated sides*. Represented by six males and two females.

ORNICHOLAX ALIENUS TAOI Carriker

FIGURE 27, *e*

Ornicholax robustus taoi CARRIKER, Lice of the tinamous, p. 171, pl. 30, figs. 1, 1a, 1936. (Host: *Tinamus t. tao.*)

This race was described from a single male, collected at Lagunita de Aroa, Venezuela. I have since secured an additional male from the type host, collected in the Sierra Perijá of Colombia. (See discussion of this race in general remarks under *Ornicholax alienus.*)

This is a well-marked race, whose nearest relative seems to be *O. a. solitarius* Guimarães and Lane. It is easily recognized by its small size, head longer than wide (unique in this character, *O. solitarius* having head measurement in male of 0.83 by 0.86), and by the male genitalia. The paramers are slender, only slightly curved, and entirely without the characteristic lateral lobes at their bases. The endomeral plate is extremely reduced in length, with the penis long, without appendages, and apparently with a tripartite tip; the spine-bearing lobes are unusually well developed, but the spine is short (but half the length of the spines in the *O. robustus* group).

ORNICHOLAX ALIENUS SOLITARIUS Guimarães and Lane

Ornicholax solitarius GUIMARÃES and LANE, Rev. Mus. Paulista, vol. 23, p. 3, pl. 1, figs. 1–1b, 1937. (Host: *Tinamus solitarius.*)

This form, like *taoi*, has the genitalia with the paramers almost straight, slender, and lacking the lateral lobes, but differs from *taoi* in structure of the endomeral plate (see fig.). The head in the male is also *wider* than long, the reverse of *taoi.* Unfortunately, the measurements given are not so complete as might be desired.

MEASUREMENTS OF ORNICHOLAX ALIENUS

Structure	*robustus* (types, from *Tinamus major castaneiceps*)				*mexicanus* (types, from *T. m. percautus*)			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	2.41	-------	2.94	-------	2.47	-------	2.73	
Head	0.76	0.84	0.825	0.846	0.80	0.89	0.83	0.93
Prothorax	0.21	0.49	0.24	0.52	0.22	0.50	0.24	0.51
Mesothorax	0.326	0.87	0.36	0.94	0.34	0.93	0.39	0.95
Metathorax	0.30	0.59	0.37	0.63	0.32	0.63	0.37	0.65
Abdomen	1.41	1.18	1.62	1.30	1.43	1.28	1.67	1.35
Antennae	(?)0.28	-------	-------	-------	0.32	-------	0.28	
Paramers	0.205	-------	-------	-------	0.23	-------	-------	
Basal plate	-------	0.13	-------	-------	-------	0.13	-------	

MEASUREMENTS OF ORNICHOLAX ALIENUS—Continued

Structure	*robustus* (from *T. serratus ruficeps*)				*mexicanus* (male from *T. m. fuscipennis*, Costa Rica)	
	Male		Female			
	Length	Width	Length	Width	Length	Width
Body	2.28		2.52		2.28	
Head	0.78	0.836	0.80	0.825	0.79	0.836
Prothorax	0.217	0.50	0.217	0.50	0.195	0.50
Mesothorax	0.337	0.868	0.33	0.846	0.326	0.89
Metathorax	0.337	0.59	0.326	0.61	0.337	0.59
Abdomen	1.27	1.21	1.49	1.28	1.28	1.17
Antennae	0.31	0.043	0.31	0.045	0.326	0.05
Paramers	0.206	0.05			0.20	0.054
Endomeral plate	0.11	0.065			0.13	0.043

Structure	*boliviensis*				*taoi*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	2.41		2.69		2.23		2.62	
Head	0.78	0.78	0.84	0.836	0.76	0.70	0.84	0.836
Prothorax	0.228	0.50	0.23	0.52	0.195	0.49	0.23	0.54
Mesothorax	0.32	0.868	0.34	0.92	0.32	0.76	0.34	0.84
Metathorax	0.30	0.57	0.347	0.63	0.29	0.54	0.326	0.59
Abdomen	1.30	1.17	1.60	1.33	1.21	1.04	1.56	1.17
Antennae	0.30	0.05	0.326	0.043	0.26	0.043	0.326	0.043
Paramers	0.195	0.087			0.174	0.087		
Endomeral plate	0.11	0.065			0.087	0.043		

Genus KELLOGGIA Carriker

KELLOGGIA BREVIPES Carriker

In this species we have another case parallel to that of *Ornicholax alienus*, where the genus is apparently composed of a single species, which in turn is split up into quite a number of closely related subspecies, all found on the different species of the avian genus *Tinamus*, the same as *Ornicholax*.

I have before me a series of *Kelloggia brevipes* taken on the following hosts: *Tinamus major castaneiceps* (the type); *T. major percautus*, *T. m. latifrons*, *T. serratus serratus*, *T. s. ruficeps*, *T. tao tao*, and *T. t. weddelli*. A casual examination of these specimens might lead one to believe that they all represent a single form, but a more careful study reveals an astonishing number of small but constant differences between most of them. There are two reliable indices that may be used for their separation into subspecies—the male genital armature and the shape of the preantennal portion of the head.

There is a slight dimorphism of the sexes in *Kelloggia*, consisting of the shape of the head and abdomen, and the former character is useful in separating the females of the various subspecies. In the above-mentioned series of specimens we have two types of genital armature, or rather of the endomeral plate, one type found in insects from *T. major castaneiceps* (*K. b. brevipes*) and *T. m. percautus* (*K. b. mexicanus*), while the other type is present in the remaining list of hosts cited above.

It is a very curious anomaly that the genitalia of the insects taken on *T. m. latifrons* and *T. serratus ruficeps* are extremely close to those of specimens from *T. tao tao*, one group being almost identical in size and shape, the other of the same shape but somewhat slenderer, but to counteract this similarity we have differences in the shape of the preantennal area of the head, as well as body measurements.

When all these characters are considered, it seems best to arrange the various known forms of *Kelloggia* in the following manner:

KELLOGGIA BREVIPES BREVIPES Carriker

FIGURE 28, *g-i*

Kelloggia brevipes CARRIKER, Univ. Nebraska Studies, vol. 3, No. 2, p. 154, pl. 9, fig. 2, 1903 (host: *Tinamus robustus*); Lice of the tinamous, p. 173, pl. 32, figs. 5, 5a, 1936 (host: *Tinamus major castaneiceps;* original designation of host incorrect).

Of all the known races of *Kelloggia brevipes* the nominate form exhibits the greatest sexual dimorphism in the shape of the preantennal portion of the head. In the male the frons is very flat, with the sides almost angulated (see fig.), while in the female it is *circular* and with the clypeal band crenulated at each side, the latter character found only on the female of *K. b. mexicanus*, but combined there with a distinct antennal band (see fig.). The endomeral plate in *brevipes* is also distinctive.

Measurements are given with those of *K. b. mexicanus*.

KELLOGGIA BREVIPES MEXICANUS, new subspecies

FIGURE 28, *j-l*

Types.—Male and female, adults, from *Tinamus major percautus*, collected by the author at Tres Zapotes, Veracruz, Mexico, April 8, 1940; in U. S. National Museum.

Diagnosis.—Nearest to the nominate form in the style of male genital armature, but with preantennal region (especially in male) very different (see fig.).

The frons is circular, not flatly rounded, and much wider, while the antennal bands in both sexes differ in having at their anterior portion a narrow, deeply pigmented section which ends posteriorly in a slender

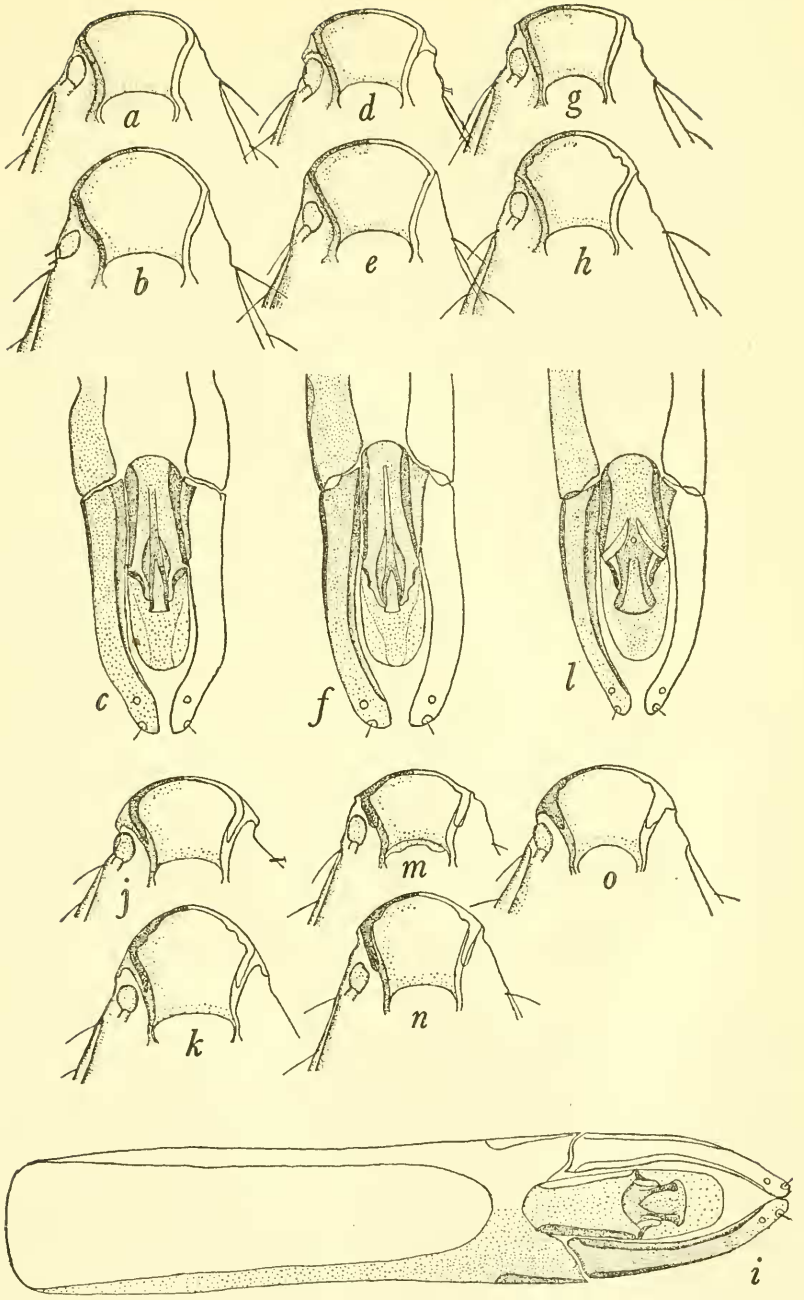

FIGURE 28.—KELLOGGIA

a–c, *Kelloggia brevipes taoi*, new subspecies: *a*, Male head; *b*, female head; *c*, male genitalia.
d–f, *K. b. latithorax* Carriker: *d*, Male head; *e*, female head; *f*, male genitalia.
g–i, *K. b. brevipes* Carriker: *g*, Male head; *h*, female head; *i*, male genitalia.
j–l, *K. b. mexicanus*, new subspecies: *j*, Male head; *k*, female head; *l*, male genitalia.
m, *n*, *K. b. ruficeps*, new subspecies: *m*, Male head; *n*, female head.
o, *K. b. chocoensis*, new subspecies: Male head.

point. The endomeral plate is shorter, has the distal portion narrower and longer, and has the anterior end narrower and with certain differences in detail of structure. The head in the male is longer, at both occiput and temples and very much wider at the temples. In the female the frons is much wider and is elliptical in shape instead of circular, while the length of head at both occiput and temples, as well as the width at temples, varies but little. There is considerable variation in the width of the temples in a series of 16 males, ranging from 0.65 to 0.74 (average, 0.0673). These 16 males were taken on two individual hosts, but both narrow and wide temples were found equally in both series.

In both *brevipes* and *mexicanus* the males have the head wider than long, while in the females the length and width are practically equal.

MEASUREMENTS OF KELLOGGIA BREVIPES

Structure	*brevipes* (types)				*mexicanus*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.71		2.28		1.79		2.30	
Head: frons		0.25		0.26		0.30		0.33
Head: temples	0.575	0.63	0.70	0.71	0.60	0.74	0.735	0.73
Head: occiput	0.456		0.57		0.50		0.59	
Prothorax	0.22	0.41	0.227	0.39	0.20	0.37	0.227	0.46
Mesothorax	0.28	0.61	0.326	0.67	0.29	0.60	0.31	0.70
Metathorax	0.27	0.466	0.30	0.52	0.27	0.46	0.336	0.56
Abdomen	1.00	0.88	1.39	1.05	1.01	0.90	1.36	1.13
Paramers	0.112	0.071			0.11	0.07		
Endomeral plate	0.082	0.036			0.08	0.036		

KELLOGGIA BREVIPES LATITHORAX Carriker

FIGURE 28, *d–f*

Kelloggia latithorax CARRIKER, Lice of the tinamous, p. 174, pl. 32, fig. 6, 1936. (Host: *Crypturellus nigrocapillus* (?), probably *Tinamus s. serratus*.)

Lectotypes.—Male and female, adults, from *Tinamus s. serratus*, collected by the author at Chiñiri, Río Kaka, Bolivia, September 6, 1934; in collection of author.

Diagnosis.—This race differs from typical *brevipes* and *mexicanus* in smaller size and different shape of the endomeral plate (see figs.). The head is much narrower at the temples in proportion to the width of the *frons*, while the prothorax is very noticeably shorter and narrower than the male of *brevipes*, but almost the same in the female, while it is much narrower than the female of *mexicanus*.

The genital armature is narrower and longer, with the paramers thicker and more curved apically and with a lateral constriction

basally; in addition, the endomeral plate is of a decidedly different shape apically. In respect to the genital armature, the Mexican specimens are intermediate between the nominate form and the present race, *latithorax*. The shape of the preantennal area in both sexes differs from both *brevipes* and *mexicanus*, the male being intermediate respecting curvature of frons, while in the female the frons is but slightly more circular than in the male, in marked contrast to both *brevipes* and *mexicanus*. The antennal bands are uniform in pigmentation like *brevipes*.

I have recently taken a series of *Kelloggia* on *Tinamus t. tao*, which contains immature specimens. I find that these, as well as another specimen (also immature) from *T. tao weddelli*, correspond very closely to *K. latithorax*. There seems to be little doubt that this is a case parallel to that of *Strongylocotes* and *Nirmocotes*, and that *K. latithorax* is the immature of *K. brevipes latithorax*.

I believe also that the true host of *Kelloggia latithorax* was *Tinamus s. serratus*, and not *Crypturellus nigrocapillus* (=*C. garleppi affinis*), since both birds were taken at Chiñiri, Bolivia, although on different dates, and that in some manner I am not able to explain, the type of *latithorax* became mixed with specimens from *C. garleppi affinis*. There is no absolute proof of this assertion, but I have up to the present time taken *Kelloggia* only on the genus *Tinamus*.

Kéler asserts that *K. latithorax* is the young of *Heptagoniodes*, which I am positive is incorrect. Both *Kelloggia* and *Heptagoniodes* are found on *Tinamus tao*, and the fact that he found a specimen of *latithorax* among *Heptagoniodes* does not prove that it is the young of that genus. I have taken it on two different individuals of *Tinamus tao* on which *Heptagoniodes* was absent but *Kelloggia brevipes* present, which would seem to be ample proof of my assertion. Measurements are given with those of *K. b. taoi*.

KELLOGGIA BREVIPES TAOI, new subspecies

FIGURE 28, *a–c*

Types.—Male and female, adults, from *Tinamus t. tao*, collected by the author at Tierra Nueva, Sierra Perijá, Colombia, July 19, 1941; in U. S. National Museum.

Diagnosis.—In the present race we have the length in both sexes, as well as the width of the abdomen in the male, about as in *K. b. mexicanus*, but in the female the abdomen is much narrower. The width of the frons is more or less the same in the sexes, the same as in the three previous races, but the length at the temples and occiput, as well as the width at the temples, is of decidedly different proportions.

The shape of the preantennal region in the male is nearer to that of *latithorax*, but it is longer; in the female the frons is decidedly circular (neither elliptical nor flatly rounded), much like the male of *mexicanus;* all thoracic segments are longer and wider than in *latithorax*, but of the same proportions.

The male genital armature differs in shape from all the previously treated races. The paramers are widest at their bases, with sides subparallel but concave, and with the tips bent abruptly inward, and also *concave* on their outer margins. The endomeral plate is rather close to that of *latithorax*, but is some shorter and wider at both ends. The basal plate also differs in shape, being rather sharply constricted just back of the distal end, a character absent in the races described above.

MEASUREMENTS OF KELLOGGIA BREVIPES

Structure	*latithorax*				*taoi*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.60	-------	2.00	-------	1.78	-------	2.28	
Head: frons	-------	0.26	-------	0.28	-------	0.27	-------	0.30
Head: temples	0.54	0.60	0.68	0.65	0.64	0.66	0.755	0.67
Head: occiput	0.445	-------	0.54	-------	0.52	-------	0.62	
Prothorax	0.16	0.35	0.217	0.38	0.206	0.39	0.24	0.41
Mesothorax	0.27	0.57	0.30	0.63	0.31	0.65	0.34	0.67
Metathorax	0.26	0.44	0.30	0.50	0.30	0.51	0.35	0.55
Abdomen	0.96	0.80	1.22	0.92	1.13	0.87	1.41	0.94
Antennae	-------	-------	-------	-------	0.23	0.045	0.22	0.045
Paramers	0.128	0.066	-------	-------	0.13	0.076	-------	
Endomeral plate	0.09	0.036	-------	-------	0.076	0.033	-------	

KELLOGGIA BREVIPES CHOCOENSIS, new subspecies

FIGURE 28, *o*

Type.—Male, adult, from *Tinamus major latifrons*, collected by the author at Malagita, Río San Juan, Chocó, Colombia, May 11, 1918; in collection of author.

Diagnosis.—This is not a particularly well marked race and is represented by but two males, including the type. It is most nearly related to *K. b. taoi*, from which it differs as follows: The frons is wider and strongly rounded (not flatly rounded); the sides of the head are emarginate at the base of the antennae (as in *mexicanus*), so that the first joint of the antennae extends beyond the margin of the head; the lateral bifurcation is wider, as in *taoi*, but the antennal bands are as in *ruficeps*, but *very wide* at their junction with the clypeal band,

being wider than in any other known race of *brevipes;* the mandibles and buccal cavity are much narrower than in *taoi* or *ruficeps*, being equal only to *brevipes* in this respect. All measurements run very close to those of the male in *taoi*, there being, however, a few discrepancies but nothing outstanding. All measurements of head and thoracic segments are somewhat smaller, except width at temples, which is slightly greater; the abdomen and antennae are also shorter.

The genitalia are narrower at base of paramers than in *taoi*, but otherwise essentially the same in all details. Measurements are given with those of *K. b. ruficeps.*

KELLOGGIA BREVIPES RUFICEPS, new subspecies

FIGURE 28, *m*, *n*

Types.—Male and female, adults, from *Tinamus serratus ruficeps*, collected by the author at Tierra Nueva, Sierra Perijá, Colombia, July 19, 1941; in U. S. National Museum.

Diagnosis.—This race also is close to *K. b. taoi.* The frons is less flattened and somewhat undulating, this being the only race here described that exhibits this character, while the sides of the preantennal area run straight back in a line with the temples. The lateral bifurcation is much narrower than in *taoi;* the whole insect is uniformly smaller. In the female the shape of the frons is very close to the female of *taoi*, but the antennal bands in both sexes are similar to those of *mexicanus*, having the more deeply pigmented incrassation in their anterior portion, but with *rounded*, not pointed, posterior ends. The head in the male is shorter at the temples and occiput (than in *taoi*) but of the same width at temples and narrower at the frons. In the female the head is of equal length and breadth at the temples,

MEASUREMENTS OF KELLOGGIA BREVIPES

Structure	*chocoensis* (male)		*ruficeps*			
			Male		Female	
	Length	Width	Length	Width	Length	Width
Body	1.82		1.69		2.01	
Head: frons		0.27		0.25		0.27
Head: temples	0.62	0.678	0.586	0.66	0.70	0.71
Head: occiput	0.51		0.48		0.575	
Prothorax	0.206	0.37	0.18	0.37	0.195	0.38
Mesothorax	0.30	0.62	0.28	0.586	0.305	0.63
Metathorax	0.28	0.467	0.26	0.467	0.29	0.50
Abdomen	1.05	0.95	0.97	0.868	1.23	0.97
Antennae	0.24	0.04	0.20	0.043	0.20	0.043
Paramers	0.12	0.068	0.12	0.065		
Endomeral plate	0.066	0.033	0.07	0.033		

but in *taoi* it is much narrower than long (0.755 against 0.67), while in *ruficeps* it is smaller in *all dimensions*.

The genitalia differ from those of *taoi* more in this race than in *chocoensis*, being narrower at base of paramers and having the paramers considerably shorter; the endomeral plate is shorter and slightly narrower, while there is the same constriction of the basal plate as in *taoi*.

Genus AUSTROKELLOGGIA Carriker

AUSTROKELLOGGIA INTERMEDIA Carriker

Austrokelloggia intermedia CARRIKER, Lice of the tinamous, p. 176, pl. 31, figs. 1–1b, 1936. (Host: *Nothocereus n. nigrocapillus*, Bolivia.)

A series of 9 males and 13 females of this interesting species was taken on two individuals of *Nothocercus bonaparti*, collected by the author at Tierra Nueva, Sierra Perijá, Colombia, in July 1941. An exhaustive series of measurements of both sexes shows considerable variation, especially in the head measurements, which run as follows:

Structure	Seven males		Eight females	
	Length	Width	Length	Width
Frons	----------	0.31–0.33 (0.326)	----------	0.293–0.33 (0.31)
Temples	0.53–0.62 (0.57)	0.61–0.62 (0.613)	0.542–0.586 (0.57)	0.56–0.61 (0.59)
Occiput	0.48–0.52 (0.51)	----------	0.49–0.53 (0.52)	

Compared with the measurements of two males and four females of the type series of *intermedia* it is found that all the measurements of *intermedia* fall within the extremes for the series of specimens taken on *N. bonaparti* (as given above).

Apparently there are no differences in the male genitalia, and so we may safely say that specimens of *Austrokelloggia* from *Nothocercus bonaparti* are *A. intermedia* Carriker. It is unusual that not even subspecific differences are found in a species of Mallophaga taken on two different host species of tinamous, although it is not by any means unique.

Genus HYPOCRYPTURELLUS Carriker

Hypocrypturellus CARRIKER, Lloydia, vol. 3, p. 298, 1940. (New name for *Hypocryptus* CARRIKER, Lice of the tinamous, p. 178, 1936, not *Hypocryptus* Förster, Verh. Ver. Rheinlande, vol. 25, p. 198, 1869: Hymenoptera.)

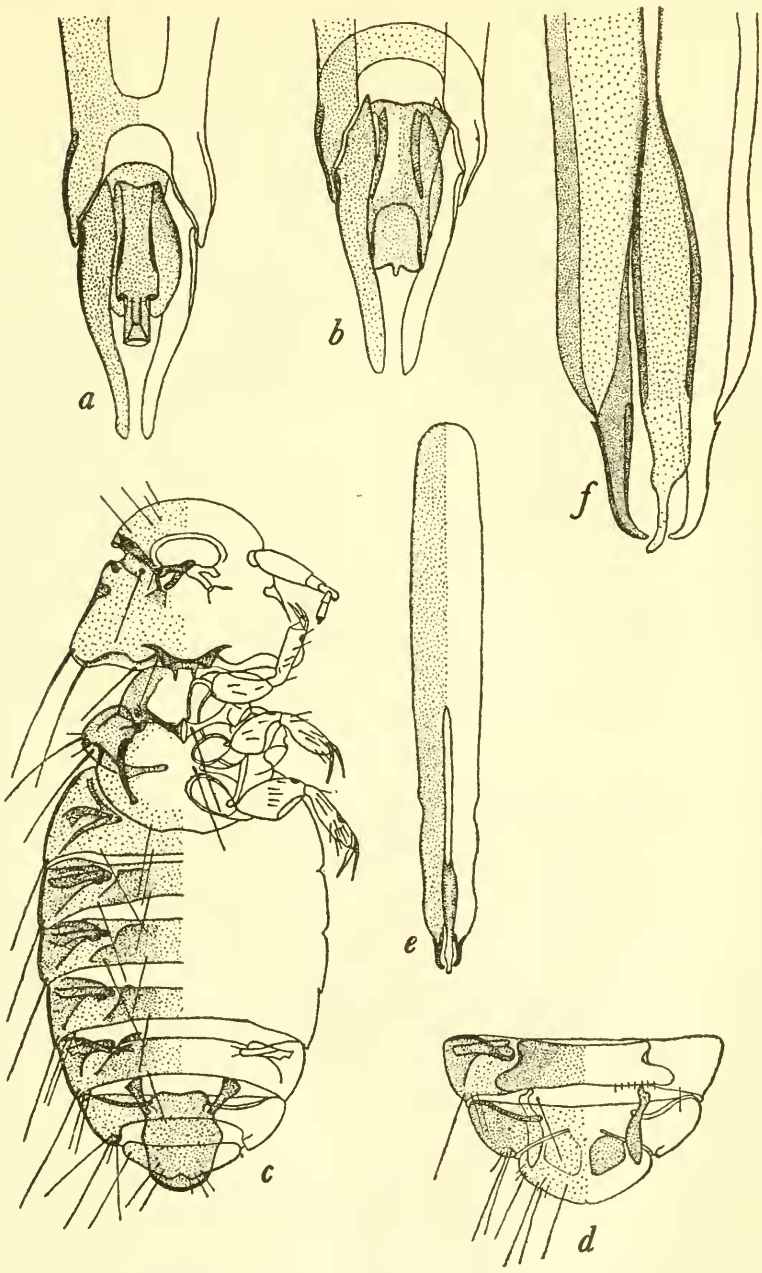

FIGURE 29.—HYPOCRYPTURELLUS and HETEROPEOSTUS

a, *Hypocrypturellus coniceps idoneus*, new subspecies: Male genitalia.
b, *H. c. boucardi*, new subspecies: Male genitalia.
c–f, *Heteropeostus carrikeri* (Clay): *c*, Body of male; *d*, female abdominal segment VII; *e*, male genitalia; *f*, male genitalia (enlarged).

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HYPOCRYPTURELLUS CONICEPS IDONEUS, new subspecies

FIGURE 29, *a*

Types.—Male and female, adults, from *Crypturellus idoneus*, collected by the author at Carraipia, La Guajira, Colombia, May 30, 1941; in U. S. National Museum.

Diagnosis.—Closely related to *H. c. boucardi* of Mexico, from which it differs as follows: Both sexes are slightly smaller in practically all dimensions (see table of measurements); in the female the head is almost the same length at the occiput but considerably shorter at the temples, while the width at the temples is but slightly less, and at the frons proportionately narrower (0.347 against 0.38). The proportions of the head in the male are practically the same, only slightly smaller.

The genital armature is of the same general style, the chief difference being in the endomeral plate. The paramers are some shorter, but slenderer distally and differently shaped basally; the basal plate is narrower at its junction with the paramers and is more deeply constricted just forward of that point. The endomeral plate is very differently shaped in every way, both basally and distally (see figs.) and resembles in several features that of *H. c. undulatus* Carriker.

HYPOCRYPTURELLUS CONICEPS BOUCARDI, new subspecies

FIGURE 29, *b*

Types.—Male and female, adults, from *Crypturellus b. boucardi*, collected by the author on Cerro Tuxtla, Veracruz, Mexico, March 28, 1940; in U. S. National Museum.

Diagnosis.—This race of *coniceps* has the genital armature more nearly resembling that of *H. c. undulatus* (from *Crypturellus u. undulatus*) than of any other of the known races, from which it differs in larger size, with longer, slenderer, and more curving paramers and slightly longer endomeral plate, which is also of slightly different shape. Measurements of the genital armature in the two races are as follows:

Structure	*undulatus*		*boucardi*	
	Length	Width	Length	Width
Basal plate		0.071		0.092
Paramers	0.102	[1] 0.056	0.151	0.072
Endomeral plate	0.066	0.038	0.087	0.041

[1] At base.

MEASUREMENTS OF HYPOCRYPTURELLUS CONICEPS

Structure	*idoneus*				*boucardi*			
	Male		Female		Male		Female	
	Length	Width	Length	Width	Length	Width	Length	Width
Body	1.58		1.79		1.65		1.83	
Head: frons		0.35		0.347		0.347		0.38
Head: temples	0.51	0.63	0.54	0.66	0.52	0.65	0.586	0.68
Head: occiput	0.445		0.49		0.45		0.50	
Prothorax	0.15	0.358	0.14	0.36	0.14	0.36	0.155	0.37
Mesothorax	0.195	0.65	0.217	0.66	0.217	0.67	0.217	0.69
Metathorax	0.174	0.39	0.185	0.41	0.195	0.41	0.195	0.43
Abdomen	0.92	0.868	1.05	0.88	0.976	0.89	1.08	0.92
Antennae	0.195		0.195		0.22		0.205	
Basal plate		0.078				0.092		
Paramers	0.135	0.059			0.15	0.072		
Endomeral plate	0.084	0.026			0.087	0.04		

HYPOCRYPTURELLUS CONICEPS subspecies

Three females of this species were taken on *Crypturellus cinnamomeus sallaei*, collected by the author at Tres Zapotes, Veracruz, Mexico, the status of which cannot be satisfactorily determined without the male sex. A careful comparison with the females of all the known races shows that the Mexican specimens may be separated from all of them except *obsoletus*, either on size, proportions, or metathoracic structure. They are so close to *obsoletus* in all these characters that I hestitate to give them a name without having seen the genital armature. When the males are available for study they will doubtless be found to differ as regards genitalia.

LIST OF TINAMOU HOSTS AND THEIR MALLOPHAGAN PARASITES TREATED IN THIS PAPER

[For a complete host list of the Tinamidae it is necessary to combine the present list with that published in Carriker, 1936, p. 182. The nomenclature here used for the Tinamidae is substantially that of Peters in his "Check-list of Birds of the World," vol. 1, pp. 12–29, 1931.]

Tinamus major castaneiceps Salvadori:
- *Pseudolipeurus tinami tinami* (Carriker).
- *Rhopaloceras aliceps* (Nitzsch).(?)
- *Heptarthrogaster minutus minutus* (Carriker).
- *Heptarthrogaster parvulus* (Taschenberg).
- *Ornicholax alienus robustus* Carriker.
- *Kelloggia brevipes brevipes* Carriker.

Tinamus major fuscipennis Salvadori:
- *Ornicholax alienus mexicanus*, new subspecies.

Tinamus major latifrons Salvadori:
- *Kelloggia brevipes chocoensis*, new subspecies.

Tinamus major percautus Van Tyne:
- *Pseudolipeurus longipes robustus*, new subspecies.
- *Pseudolipeurus tinami tinami* (Carriker).
- *Strongylocotes pellucidifrons*, new species.
- *Heptarthrogaster minutus mexicanus*, new subspecies.
- *Heptarthrogaster parvulus* (Taschenberg).
- *Pterocotes aberrans mexicanus*, new subspecies.
- *Pectenosoma verrucosa tinami*, new subspecies.
- *Ornicholax alienus mexicanus*, new subspecies.
- *Kelloggia brevipes mexicanus*, new subspecies.

Tinamus serratus ruficeps Sclater and Salvin[1]:
- *Pseudolipeurus tinami ruficeps*, new subspecies.
- *Strongylocotes angulocapitis ruficeps*, new subspecies.
- *Rhopaloceras genitalis genitalis* Carriker.
- *Heptarthrogaster minutus* (Carriker).
- *Heptarthrogaster parvulus* (Taschenberg).
- *Pterocotes aberrans colombianus*, new subspecies.
- *Ornicholax alienus robustus* Carriker.
- *Kelloggia brevipes ruficeps*, new subspecies.

Tinamus serratus serratus (Spix)[1]:
- *Pseudolipeurus tinami serratae*, new subspecies.
- *Strongylocotes angulocapitis angulocapitis* Carriker.
- *Heptarthrogaster minutus* (Carriker).
- *Heptarthrogaster parvulus* (Taschenberg).
- *Heptarthrogaster grandis* Carriker.
- *Ornicholax alienus boliviensis*, new subspecies.
- *Kelloggia brevipes latithorax* Carriker.

Tinamus solitarius (Vieillot):
- *Strongylocotes wernecki* Guimarães and Lane.
- *Ornicholax alienus solitarius* Guimarães and Lane.

[1] *T. s. ruficeps*, as well as all other races of *T. serratus*, has been placed under *major* by some recent authors, and the relationships of the mallophagan parasites tend to corroborate this change.

Tinamus tao kleei (Tschudi) :
Pseudolipeurus taoi peruvianus, new subspecies.
Pterocotes taoi Carriker.
Tinamus tao tao Temminck :
Strongylocotes angulocapitis taoi, new subspecies.
Rhopaloceras oniscus (Nitzsch).
Heptarthrogaster parvulus (Taschenberg).
Heptarthrogaster grandis Carriker.
Pterocotes taoi Carriker.
Heptagoniodes agonus (Nitzsch).
Ornicholax alienus taoi Carriker.
Kelloggia brevipes taoi, new subspecies.
Tinamus tao weddelli Bonaparte :
Strongylocotes angulocapitis weddelli, new subspecies.
Pterocotes taoi Carriker.
Heptagoniodes dimorphus, new species.
Nothocercus bonaparti (G. R. Gray) :
Pseudolipeurus grandis Carriker.
Strongylocotes spinosus bonaparti, new subspecies.
Physconella nothocercae Carriker.
Nothocotus parvithorax parvithorax Carriker.
Rhopaloceras laticeps bonaparti, new subspecies.
Heptapsogaster temporalis nothocercae, new subspecies.
Trichodopecostus spinosus praegracilis, new subspecies.
Heptapsus nothocercae Carriker.
Heptapsus inexpectatus, new species.
Austrokelloggia intermedia Carriker.
Nothocercus julius (Bonaparte) :
Strongylocotes spinosus spinosus (Piaget).
Nothocercus nigrocapillus cadwaladeri Carriker :
Strongylocotes spinosus peruvianus, new subspecies.
Heptapsogaster temporalis nothocercae, new subspecies.
Nothocercus nigrocapillus nigrocapillus (G. R. Gray) :
Pseudolipeurus grandis Carriker.
Strongylocotes spinosus subspinosus Carriker.
Physconella nothocercae Carriker.
Austrokelloggia intermedia Carriker.
Crypturellus boucardi boucardi (P. L. Sclater) :
Pseudolipeurus longipes similis, new subspecies.
Strongylocotes complanatus boucardi, new subspecies.
Rhopaloceras heterogenitalis heterogenitalis, new species.
Heptapsogaster mandibularis modestae, new subspecies.
Heptapsogaster inexpectata tuxtlae, new subspecies.
Heptapsogaster temporalis boucardi, new subspecies.
Megapcostus multiplex multiplex Clay.
Discocorpus cephalosus furculus, new subspecies.
Pectenosoma verrucosa boucardi, new subspecies.
Hypocrypturellus coniceps boucardi, new subspecies.
Crypturellus cinnamomeus cinnamomeus (Lesson) :
Strongylocotes complanatus fimbriatus Clay.

Crypturellus cinnamomeus sallaei (Bonaparte)[2]:
Pseudolipeurus longipes similis, new subspecies.
Pseudophilopterus hirsutus similis, new subspecies.
Strongylocotes complanatus fimbriatus Clay.
Heptapsogaster temporalis acutiventris Clay.
Megapeostus secundus Clay.
Pectenosoma verrucosa cinnamomea, new subspecies.
Hypocrypturellus coniceps subsp.
Crypturellus garleppi affinis (Chubb):
Pseudolipeurus longipes garleppi, new subspecies.
Strongylocotes complanatus interruptus Carriker.
Rhopaloceras sp.
Heptapsogaster mandibularis garleppi, new subspecies.
Heptapsogaster temporalis chiñirii Carriker.
Heptarthrogaster minutus (Carriker).
Megapeostus parvigenitalis Carriker.
Pectenosoma verrucosa angusta Carriker.
Crypturellus idoneus (Todd)[3]:
Pseudolipeurus sanctae-martae, new species.
Rhopaloceras heterogenitalis spatulata, new subspecies.
Heptapsogaster mandibularis idoneus, new subspecies.
Heptapsogaster inexpectata magdalenae, new subspecies.
Megapeostus multiplex idoneus, new subspecies.
Discocorpus cephalosus intermedius, new subspecies.
Hypocrypturellus coniceps idoneus, new subspecies.
Crypturellus noctivagus dissimilis (Salvadori):
Heptapsogaster mandibularis noctivagi Clay.
Crypturellus noctivagus noctivagus (Wied):
Heptapsogaster mandibularis noctivagi Clay.
Crypturellus obsoletus crucis Bond and de Schauensee:
Megaginus emarginatus emarginatus Carriker.
Rhopaloceras brevitemporalis Carriker.
Heptapsogaster mandibularis crucis, new subspecies.
Crypturellus obsoletus obsoletus (Temminck):
Pseudolipeurus longipes longipes (Piaget).
Heptapsogaster mandibularis stultus Clay.
Heptapsogaster inexpectata inexpectata, new name.
Crypturellus obsoletus ochraceiventris (Stolzmann):
Strongylocotes complanatus intermedius, new subspecies.
Crypturellus obsoletus punensis (Chubb):
Pseudolipeurus longipes carrikeri Hopkins, new subspecies.
Strongylocotes complanatus nirmoides (Carriker).
Megaginus emarginatus emarginatus Carriker.
Rhopaloceras brevitemporalis Carriker.
Heptapsogaster temporalis boliviensis, new subspecies.
Heptapsogaster platycephalus asymmetricus, new subspecies.
Pectenosoma verrucosa punensis, new subspecies.
Crypturellus soui inconspicuus Carriker:
Strongylocotes subconiceps subconiceps Carriker.
Physconella kelloggi subsimilis Carriker.

[2] According to Wetmore (Proc. U. S. Nat. Mus., vol. 93, p. 229, 1943) this bird is *C. cinnamomeus sallaei*, not *C. c. cinnamomeus* as given by Peters.

[3] I cannot follow Peters in making this form a subspecies of *cinnamomeus*. Its parasites are very close to those from *C. b. boucardi*, but it seems best to keep it as a distinct species.

Megaginus emarginatus excavatus, new subspecies.
Heptapsogaster inexpectata benii, new subspecies.
Heptapsogaster platycephalus platycephalus Carriker.
Pectenosoma verrucosa inconspicua, new subspecies.

Crypturellus soui meserythrus (P. L. Sclater) :
Strongylocotes subconiceps subconiceps Carriker.
Megaginus emarginatus lataclypeus, new subspecies.
Rhopaloceras rudimentarius Carriker.
Heptapsogaster mandibularis tapicollae, new subspecies
Pectenosoma verrucosa meserythra, new subspecies.

Crypturellus soui modestus (Cabanis) :
Heptarthrogaster costaricensis, new species.

Crypturellus soui mustelinus (?) (Bangs) (Sierra Perijá, Colombia) :
Strongylocotes subconiceps perijae, new subspecies.
Rhopaloceras rudimentarius Carriker.
Heptapsogaster mandibularis motilonensis, new subspecies.

Crypturellus soui nigriceps (Chapman) :
Megaginus emarginatus dissimilis, new subspecies.
Rhopaloceras rudimentarius Carriker.
Heptapsogaster mandibularis nigriceps, new subspecies.
Pectenosoma verrucosa nigriceps, new subspecies.

Crypturellus soui panamensis (Carriker) :
Physconella kelloggi kelloggi (Paine).

Crypturellus tataupa tataupa (Temminck) :
Pseudolipeurus tataupicola, new species.
Megaginus emarginatus emarginatus Carriker.
Rhopaloceras pennaticeps (Paine and Mann).
Heptapsogaster mandibularis mandibularis Carriker.
Pectenosoma verrucosa parva Carriker.

Crypturellus undulatus undulatus (Temminck) :
Heptapsogaster inexpectata undulata, new subspecies.
Heptapsogaster temporalis temporalis Carriker.
Heptarthrogaster latacephalus, new species.
Pectenosoma verrucosa yapurae, new subspecies.

Crypturellus undulatus yapura (Spix) :
Heptapsogaster mandibularis yapurae, new subspecies.
Pectenosoma verrucosa yapurae, new subspecies.

Crypturellus variegatus salvini (Salvadori) :
Pectenosoma verrucosa verrucosa (Taschenberg).

Crypturellus variegatus variegatus (Gmelin) :
Strongylocotes complanatus sctifer Hopkins.
Pectenosoma verrucosa verrucosa (Taschenberg).

Rhynchotus rufescens maculicollis (G. R. Gray) :
Strongylocotes lipogonus alticola, new subspecies.
Docophorocotes sexsetosus secundus, new subspecies.

Rhynchotus rufescens rufescens (Temminck) :
Strongylocotes lipogonus lipogonus (Nitzsch).

Nothoprocta branickii Taczanowski :
Cuclotocephalus extraneus extraneus Carriker.
Lamprocorpus hirsutus Carriker.

Nothoprocta cinerascens (Burmeister) :
Menacanthus nothoproctae, new species.
Rhyncothura heterura, new species.

Rhyncothura chacoensis, new species.
Heteropeostus carrikeri (Clay).
Nothoprocta ornata (G. R. Gray):
Cuclotocephalus extrancus ornatus, new subspecies.
Heptapsogaster tesselatus ornatus, new subspecies.
Lamprocorpus hirsutus Carriker.
Nothoprocta ornata subsp. (Incachaca, Bolivia):
Cuclotocephalus secundus incachacae, new subspecies.
Nothoprocta pentlandi pentlandi (G. R. Gray):
Cuclotocephalus extrancus similis, new subspecies.
Cuclotocephalus secundus secundus Carriker.
Heptapsogaster tesselatus pentlandi, new subspecies.
Rhyncothura subteres, new species.
Nothura maculosa oruro Bond and de Schauensee:
Rhyncothura minuta boliviana, new subspecies.
Nothura maculosa peruviana Berlepsch and Stolzmann:
Rhyncothura testudo (Clay).
Tinamotis pentlandi Vigors:
Tinamotaecola andinae, new species.
Rhyncothura andinae, new species.

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NOTE

Opportunity is here taken to correct a few errors that occurred in "Lice of the Tinamous" (Carriker, 1936):

Page 183: Under *Crypturellus atrocapillus*

Heptapsogaster mandibularis subsp. should read *Heptapsogaster temporalis chiñirii.*

Megapeostus asymmetricus microgenitalis should read *Megapeostus asymmetricus parvigenitalis.*

Crypturellus atrocapillus should read *Crypturellus garleppi affinis.* (Also same correction wherever this host name appears.)

Page 186: Text Plate 31, Figure 3

H. tataupa should read *H. genitalis.*

Also, it has been called to my attention by Paul H. Oehser that the generic name *Dimorphia*, proposed by me for a group of Mallophaga infesting the parrots (Lloydia, vol. 3, p. 294, Dec. 1940) is preoccupied in Diptera (Malloch, Ann. Mag. Nat. Hist., ser. 9, vol. 9, p. 273, 1922). I therefore now propose the name **Epipsittacus** to replace *Dimorphia* Carriker, preoccupied, the genotype being *Epipsittacus mirabilis* (Carriker).

U. S. GOVERNMENT PRINTING OFFICE: 1944